U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE
SILVER SPRING, MARYLAND

ENVIRONMENTAL ASSESSMENT OF EAST TIMBALIER ISLAND RESTORATION PROJECTS CWPPRA PROJECTS XTE-67 AND XTE-45/67B

LAFOURCHE PARISH, LOUISIANA

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Lafourche Parish, Louisiana

1.0 INTRODUCTION

This Environmental Assessment (EA) was prepared to evaluate the impacts of two projects to improve the integrity and prolong the life of the remaining portion of East Timbalier Island. The Federal project numbers are XTE-67 and XTE-45/67B and the State numbers are TE-25 and TE-30 for Central, East Timbalier Island Restoration and East, East Timbalier Island Sediment Restoration, respectively. Collectively, they will be referred to as East Timbalier Island Sediment Restoration and individually as Central ETI or East ETI. Features include placement of dredged material to close breaches and fill shallow ponds, thus creating marsh elevations. An elevated dune would be constructed to maintain the integrity of the island and prevent future over wash. Shoreline stabilization, using hard structures, would be placed along unprotected sections of the project to allow the dredged material to consolidate and to prevent erosion from daily and low frequency waves and currents. The dredged material would be obtained from Timbalier Bay in the vicinity of Little Pass.

These projects are part of the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) of 1990 (16 U.S.C. §§ 777c, 3951-3956). In accordance with CWPPRA, the heads of five federal agencies and the Government of the State of Louisiana comprise a Task Force to implement a "comprehensive approach to restore and prevent the loss of [*sic*] coastal wetlands in Louisiana" (16 U.S.C. § 3952 (b) (2)). The five federal agencies involved are: the U.S. Army Corps of Engineers (COE); the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS); the U.S. Department of Interior, Fish and Wildlife Service (FWS); the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS); and the U.S. Environmental Protection Agency (EPA). East Timbalier Island Restoration projects were listed as critical, short-term projects in the Louisiana Coastal Wetlands Restoration Plan (Louisiana Coastal Wetlands Conservation and Restoration Task Force, 1993 a). Central ETI was included in the Third Priority Project List Report and East ETI was included in the Fourth Priority Project List Report (Louisiana Coastal Wetlands Conservation and Restoration Task Force, 1993b and 1994). Both projects soon will be ready for construction.

1.1 Technical Background

The coastal barrier islands of Louisiana represent the seaward limit of the estuarine system with water exchange between the bays and the Gulf of Mexico taking place through tidal inlets between the islands. Barrier islands buffer high velocity winds, flooding, saltwater intrusion, increased tidal prisms, and intense erosion by wave and current action associated with storm systems in the coastal wetlands. East Timbalier Island, in particular, protects shallow water infrastructure of the oil and gas industry in Timbalier Bay from the wave energies of the open gulf. Barrier islands also protect sensitive wetland habitat from an offshore-derived oil spill.

The value of barrier islands for protecting mainland shorelines, wetlands, and estuarine habitats often has been stated (Nummedal, 1982; McBride et al., 1992; Boesch et al., 1994; van Heerden, 1994). It has been estimated that every 1 kilometer (0.6 mile) of barrier island shoreline protects 30 square kilometers (12 square miles) of wetland-estuarine habitat (Guntenspergen and Vairin, 1996; McBride and Byrnes, 1997). List and Hansen (1994) evaluated the value of barrier islands for protecting the mainland shoreline from locally-generated wave attack by using the shallow water wave prediction model, HISWA. HISWA concluded that "wide, shallow bays have a strong controlling influence on the wave energy reaching the mainland shoreline, and in such cases the removal of the barrier island would make little difference." With such opposing viewpoints, it is obvious that the full importance of the role of barrier islands in protecting coastal marshes within the Louisiana Coastal Zone still is being debated (Mathies, 1995). There are approximately 3 million acres of marsh in Louisiana, or 40 percent of the nation's coastal wetlands (Boesch et al., 1994). Since there are approximately 384 miles of marshes along the Louisiana coast, of which approximately 110 miles are behind barrier islands, the importance of barrier islands should not be underestimated.

Louisiana barrier island erosion and wetland loss was the theme of a workshop held in New Orleans, Louisiana, in April of 1997 (Stone et al., 1997). These topics are extremely important considering that Louisiana contains 25 percent of the vegetated wetlands and 40 percent of the Nation's coastal and estuarine wetlands in the 48 contiguous states (Williams et al., 1997). "These coastal wetland environments, which include associated bays and estuaries, support a harvest of renewable natural resources with an estimated annual value in excess of $1 billion. At the same time, Louisiana also has the highest rates of wetlands loss: 80 percent of the Nation's total loss has occurred in this State" (Williams et al., 1997). Research and studies, in the past and on-going, have attempted to resolve wetland loss. People involved include scientists from the federal and state governments and universities, planning and resource protection agencies and the private sector. In addition to the plans and work accomplished or included in CWPPRA and the Priority Project Lists, two CWPPRA feasibility studies are under way. The Mississippi River Comprehensive Diversion Study, headed by the U.S. Army Corps of Engineers, is looking at large-scale diversion projects. The Barrier Island Restoration Feasibility Study, under contract with the Louisiana Department of Natural Resources, is addressing the potential use of offshore and inshore sands for nourishment and maintenance purposes of the barrier islands.

1.1.1 Habitat Diversity

Barrier island habitat has the highest species diversity and abundance (Condrey et al. 1995) of coastal habitats. Habitat includes beaches, dunes and higher elevations supporting upland vegetation, swales between dunes, intertidal areas and marshes with typical transitional and wetland vegetation, and tidal flats. Birds (both migratory and resident) comprise the majority of species utilizing barrier islands.

Saline marshes on the land ward side of East Timbalier Island provide nursery and forage habitat for a variety of estuarine and estuarine-dependent marine finfish, mollusks, and crustaceans. The shallow bays, tidal passes and the protected area between rock breakwaters and the beach of East Timbalier Island are habitats for migratory and resident

fishery species.

1.1.2 Geomorphology and History

Barrier islands are elongate geologic formations of unconsolidated sediment formed roughly parallel to the shoreline and backed by saline marsh. Barrier island formation, especially those associated with the Mississippi River, have been studied extensively (Kwon, 1969; Nummedal, 1982; Penland and Suter, 1988; List et al., 1994; Lombardo, 1992; Reed, 1995).

The Bayou Lafourche Delta complex, which began about 3,500 years ago, is the source of sediments composing East Timbalier Island (Penland and Suter, 1988). As the Bayou Lafourche distributary was abandoned the growth of the Lafourche Delta ceased, and with continued decrease in discharge, its gulf ward margin experienced erosion by wave attack. Gradually, an erosional headland (Caminada-Moreau headland), flanked by barrier islands (East Timbalier Island and Timbalier Island on the west and Grand Isle on the east) formed - a Stage I shoreline (Penland and Suter, 1988). Sand deposits from the abandoned headland continue to rework and disperse by longshore currents into flanking barriers enclosing interdistributary bays (Timbalier Bay on the west and Caminada Bay on the east). The Timbalier Islands have experienced considerable recession and have extended downdrift through erosion on their eastern and accretion on their western ends (Kwon, 1969). As the erosional process continues, the headlands will separate from the shoreline, forming a lagoon behind the barrier islands. The barrier island arc that forms will continue to evolve by migrating shoreward because of continued subsidence and sediment redistribution. Tidal inlets already have fragmented the headland area west of Bayou Lafourche, and the eastern portion of East Timbalier Island.

1.1.3 Migration and Loss Rates

The barrier islands of Louisiana are eroding at alarming rates, in many areas the long-term erosion rate exceeds 20 meters (65 feet) per year. Within the past 100 years, these barrier islands have decreased in area by more than 40 percent, and some islands have lost 90 percent of their area. A few of the islands are predicted to disappear within the next two decades (List et al., 1994).

All of the barrier islands are experiencing land ward migration due to storm impacts and natural subsidence. Lombardo (1992) studied the geology of East Timbalier Island and found that the island has retreated approximately 3,000 meters (9,840 feet) during the study period of 136 years, an average of 22 meters (72 feet) per year. During that same time, over 1,000 hectares (over 2,500 acres) were redistributed on the island. Over 7.5 hectares (nearly 19 acres) of island sediments were either shifted, lost or added each year with the trends including large scale westward accretion, breached spit detachment and interior marsh platform deterioration.

Bayside erosion, a factor in the deterioration of back side marsh, is caused by an inadequate sediment supply, high rates of relative sea level rise, and

the passage of cold fronts (McBride and Byrnes, 1997). Cold fronts cause increased wave energy on the northern or bay side of barrier islands.

Relative sea level rise and the erosive forces of tropical storms and hurricanes frequently are cited as being the principal factors in shoreline changes of barrier islands. (Lombardo, 1992). The highest rates of subsidence, using geodetic, tide gauge and radiocarbon data sets, were 0.5 to 1.0 centimeters per year (0.20 to 0.39 inches per year) in the Terrebonne Basin (Reed, 1995). During Lombardo's (1994) study period of 136 years, over 20 tropical storms and 33 hurricanes affected the island. Storm impacts ranged from dune ridge over wash and minor shore face erosion to major breaches and massive sediment loss. McBride and Byrnes (1997) predict that East Timbalier Island would most likely disappear within 100 years except for a small land fragment. Other predictions (van Beek, 1993), based on long term erosion rates from the 1880's to 1990's, are that East Timbalier Island would disappear by the year 2024 (Reed, 1995).

In summary, "Louisiana barrier island systems have experienced land ward migration, area loss, bayside erosion, and island narrowing as a result of complex interactions among subsidence, eustatic sea level rise, wave processes, storm impacts (cold fronts and tropical cyclones), inadequate sediment supply, and intense human disturbance (levees; oil, gas, and sulfur extraction activities; access canals, seawalls; jetties)" (McBride and Byrnes, 1997).

1.1.4 Previous Shoreline Protection Efforts

Since 1970, East Timbalier Island has been the site of the most intensive oil and gas development on Louisiana's barrier islands. An extensive system of over 62 kilometers (39 miles) of access canals had been dredged over 10 years ago in back barrier bays and marsh areas (Penland and Suter, 1988). An elaborate network of pipelines connects production facilities both offshore and in Timbalier Bay to coastal Louisiana. To protect oil and gas operations and maintain East Timbalier Island, stabilization efforts were begun in the 1950's by Gulf Oil Company. A dirt levee was built along the higher ground along the northern side of the island prior to 1965. Elevations of this levee varied between +2.4 and 6 meters (+8 and +20 feet) mean sea level (MSL) and served to prevent washovers of northwesterly wind driven waves on the bay side.

After Hurricane Betsy in 1965, three groins were constructed - two near the central and narrowest part of the island and the other near the western end where breaches had occurred. Later in 1966, the groins were extended 90 kilometers (300 feet) and a third groin was built west of the two central groins. A rock levee or seawall was built parallel to the beach joining the three groins. By 1974, 16 kilometers (10 miles) of rock seawall had been constructed with 30-meter (100-foot) long groins every 60 meters (200 feet). In most areas, the seawall was constructed 3 to 15 meters (10 to 50 feet) land ward of the gulf. During this same period, the bay-side dirt levee was armored with stone in the areas most vulnerable to wave attack from the bay (van Beek and Debusschere, 1994)

After Hurricane Carmen in September 1974, over 75 percent of the rock seawall was scattered with only the sections armored with 3 to 6 ton boulders remaining. About half of the dirt levee remained, however, there were at least five breaches with channels from 1.5 to 3 meters (5 to 10 feet) deep. Rehabilitation work involved constructing rock dams in the breached areas, and rebuilding the rock levee along the original alignment where possible.

Although the first seawall was land ward of the shoreline, the shoreline has continued to erode at a rate of 10 to 12 feet per year through and behind the seawall. The seawall has settled, probably as a result of over-steepening and instability of the shore face (van Beek, 1993), so that now the seawall functions as a breakwater.

1.1.5 Previous Restoration Efforts

East Timbalier Island is the site of created wetlands constructed to compensate for the natural resources injured by a blowout and oil spill on September 29, 1992, which impacted 122 acres of intertidal marshes within the Bayou Lafourche barrier system (Miller, 1994). Greenhill Petroleum Corporation, owner of the blowout well, agreed to create elevations and plant marsh grass on nearly 8 hectares (19.7 acres) of intertidal marsh and 0.8 hectares (nearly 2 acres) of hurricane washover area; and conduct a 5-year monitoring study of the project area. This mitigation project was designed to prolong the life of East Timbalier Island and to establish coastal habitat to replace the ecological functions lost due to the blowout and oil spill. Wetland creation began on December 28, 1993, and was completed on April 7, 1994 (Coastal Environments, Inc., 1995). Some planting was done in mid-June, however, due to unfavorable weather conditions, planting was postponed until early October. Success of the plantings was varied due, in part, to storm-caused breaches and unfavorable conditions for natural establishment of marsh grasses.

1.1.6 Current Condition

In August 1992, Hurricane Andrew crossed the Louisiana coastline in close proximity, but slightly west of Timbalier Island. The back-levee on East Timbalier Island was breached in approximately 25 places. Washouts were deep, widest and most frequent in the narrow eastern half of the island, which was breached over a distance of about 1,220 meters (4,000 feet). A shallow breach over 300 meters (1,000 feet) wide separated the western tip of the island. The breakwater crest in the vicinity of both the large breach and the severed west end is slightly below mean sea level. Otherwise the breakwater remains nearly 1 meter (2 to 3 feet) above mean sea level (van Beek, 1993).

In 1993, the total land area of East Timbalier Island was 163 hectares (403 acres). The back-levee is now near the center of the island, and serves as a sand trap. Expanses of beach have formed north of the subsided or breached breakwater with little marsh vegetation remaining between the gulf and back-island levees. In the area where the breakwater has subsided, there is increased wave energy and near unimpeded connection to the Gulf of Mexico (Williams, 1998). Gulf ward of the breakwater, a

steep shore face approximately 4 meters (13 feet) has developed. Average water depths between the breakwater and the beach range from 0.5 to 1.5 meters (1.5 to 5 feet). There is a large, shallow (0.5 meter or 1.5 feet) lagoon about 5.3 hectares (13 acres) on the western end of the island (Williams, 1997).

1.2 Project Location

East Timbalier Island (Figure 1) is approximately 11.5 kilometers (5.5 miles) long and is located about 104 kilometers (65 miles) south-southwest of New Orleans, Louisiana. It is the easternmost barrier island forming the southern border of Lafourche Parish which is in the Timbalier Subbasin of the Terrebonne Basin. This island is separated from the Bayou Lafourche headlands to the east by Penrod Slip (Raccoon Pass) and Timbalier Island to the west by Little Pass (Little Pass Timbalier). Timbalier Bay is north of East Timbalier Island and the Gulf of Mexico is south of the Island. East Timbalier Island is centered at 29^0 04'00" north latitude and $90^0$18'00" west longitude. Fill for Central ETI would be separated into two units; East ETI is contiguous with the eastern segment of Central ETI. The two projects are located in the central and eastern portions of the island (Figure 2).

1.3 Project Funding

Eighty-five percent of the funding for this project is provided through CWPPRA with 15 percent of the cost shared by the State of Louisiana, Department of Natural Resources (DNR). The project is administered by cooperative agreement between the DNR and NMFS.

2.0 PURPOSE AND NEED FOR ACTION

2.1 Purpose

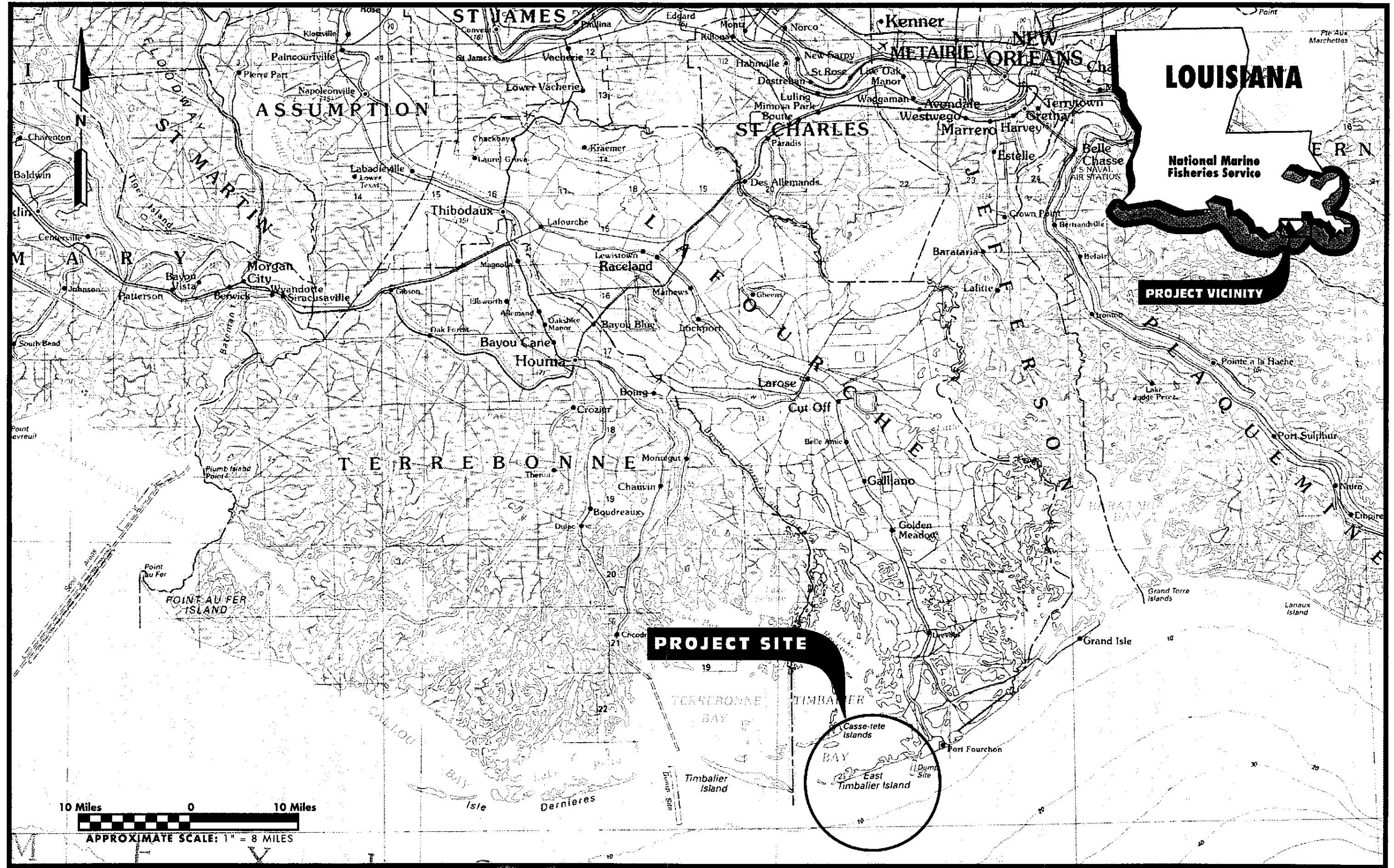
The major goal of CWPPRA is to "restore and prevent the loss of coastal wetlands in Louisiana." The purpose of the East Timbalier Island Sediment Restoration projects is to create habitat and increase the longevity of the island using soft-structural (sand) techniques for habitat creation and hard structures (rubble mound revetment) where shoreline stabilization is needed. To enhance and protect the marsh elevations that would be created, to help maintain the integrity of the island and to prevent future over wash, an elevated dune would be constructed. Unprotected sections of the project would be stabilized using hard structures to allow the dredged material to consolidate and to prevent erosion from daily and low frequency waves and currents.

2.2 Need for Action

There is a critical need to protect and extend the life of barrier islands because of their role in the protection of renewable resources. Reasons to restore barrier islands are:

2.2.1 Protection of a Highly Productive Marsh

Highly productive saline marsh occurs on the lee side (north) of East Timbalier Island. Saline marsh vegetation provides nursery and feeding habitat for estuarine-dependent fish and shellfish and contributes organic detritus to the estuarine food web of Timbalier Bay.



GOTECH, INC. & CK ASSOCIATES, INC.
CONSULTING ENGINEERS

NOTE:
BASE MAP TAKEN FROM U.S.G.S. MAP "STATE OF LOUISIANA", DATED 1990, AT A SCALE OF 1:500,000

COASTAL WETLANDS PLANNING, PROTECTION AND RESTORATION PROJECT
East Timbalier Island Restoration Project

PARISH MAP

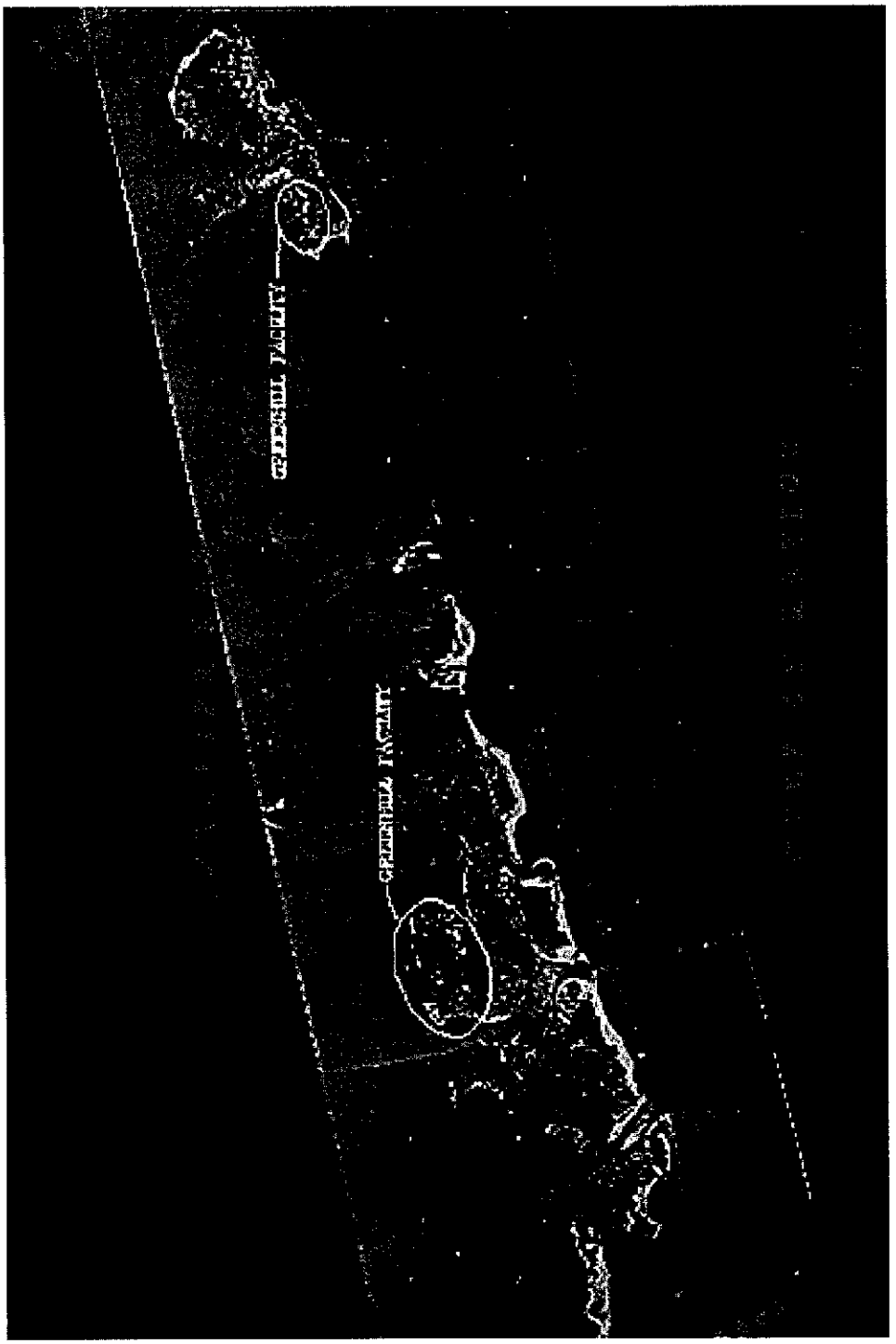


Figure 2.
East Timbalier Island, Louisiana
Including Project Areas and
Infrastructure Located on Island

Saline marshes fringe Timbalier Bay and are backed by brackish, intermediate and fresh marshes. Loss of saline marsh, with the accompanying saline water intrusion into fresher areas, would reduce and change marsh types and potentially reduce marsh productivity (T. Baker Smith & Son, Inc., 1997).

2.2.2 Reduction of coastal land loss

Louisiana is in danger of losing the valuable estuarine habitat of Timbalier Bay which, without East Timbalier Island, would convert to the less productive open water of the Gulf of Mexico. Marsh loss rates of the areas ringing Timbalier Bay could accelerate without the protection East Timbalier Island provides from storm-induced waves.

2.2.3 Protection of Inland Communities from Storm Surge and Flooding

The protection from hurricanes and storms provided by barrier islands off the Louisiana coast was documented by the U.S. Army Corps of Engineers (1984). East Timbalier Island is a narrow barrier island that has absorbed the brunt of several direct impacts by hurricanes and tropical storms. The island provides protection for the inhabitants of the lower Bayou Lafourche area by reducing wave energy and storm surge reaching the mainland.

2.2.4 Protection of Inland Marshes

Barrier islands have defined Louisiana's estuarine area for several hundred years. Without these islands, some coastal marshes would be subject to greater erosion from tidal and storm-driven currents. Since intertidal marshes are among the most productive ecosystems, their rapid reduction in area would significantly impact the economy of south Louisiana.

2.2.5 Maintain Unique Fishery Habitat

Timbalier Bay and the saline marshes of East Timbalier Island provide significant estuarine habitat for marine-transient and resident fishery species. This estuary, near the Gulf of Mexico spawning areas, provides nursery and foraging habitats that support the production of commercially and recreationally important fish and shellfish.

Loss of the barrier islands which form the outer edge of Timbalier Bay would reduce the size of the estuary (saline water would reach coastal marshes) and likely would result in the eventual decline of the fishing industry (van Heerden and DeRouen Jr., 1997).

2.2.6 Maintain Nesting/Resting Sites for Shore Birds and Migrating Birds

With the exception of the extreme southern portion of the active Mississippi River delta, East Timbalier Island and the other barrier islands provide the southernmost feeding and resting area for birds migrating south from Louisiana across the Gulf of Mexico. Likewise, the islands are the first land area encountered in Louisiana upon their return. Upland vegetation is important for perch and resting habitat, along with providing necessary habitat for prey species.

Many colonial shore birds nest on sandy beaches of barrier islands. Other sea and wading birds either rest, nest or forage on the barrier islands or nearby in adjacent marshes or shallow water areas.

2.2.7 Maintain Shallow Near-shore Marine Fisheries Habitat

Gulf of Mexico waters adjacent to East Timbalier Island are protected by the rock breakwater installed by Gulf Oil Company. This area provides shallow, relatively calm habitat for marine fishes. The rocks are habitat for sessile organisms, which attract small fish and their predators. The area is a favorite of recreational fishermen.

2.2.8 Protect Oil and Gas Resources and Infrastructure

The protection offered by the barrier islands and wetlands reduces the cost of oil and gas exploration and production in the coastal zone. Without barrier islands, structures would have to be rebuilt or constructed to withstand gulf conditions. Also, there would be an increase in the probability of oil spills from ruptured wells or pipelines in Timbalier Bay that were not designed for gulf conditions.

2.3 Preliminary Performance

Subsequent to the inclusion of Central ETI on the Third Priority Project List and East ETI on the Fourth Priority Project List, the NMFS conducted an investigation on May 2, 1997, to develop preliminary designs for the two restoration projects. Central ETI was estimated originally to create 87 acres using 890,000 cubic yards of material. After field surveys were completed, the Central ETI project needs were 114 acres and 402,000 cubic yards of fill to be placed to a +2.0-foot National Geodetic Vertical Datum (NGVD) elevation . The original Central ETI project proposed filling three areas of shallow ponds and low-lying sand flats land ward of the onshore breakwaters. This was revised so that fill would be placed in the westernmost area and the remaining two would be connected.

Originally East ETI project was estimated to require 1,875,000 cubic yards of borrow material to create 129 acres of land built to an elevation of +3.0 feet NGVD. Field surveys estimate that 2,450,000 cubic yards of borrow material would be needed to construct 216 acres. The large difference is attributed to increased open water due to the breached area on the eastern end of the island after Hurricane Andrew. The East ETI project consists of filling and stabilizing the eastern end of the island. Since the existing breakwater is either submerged, displaced or exposed (but in need of repair), a stable containment system will have to be constructed prior to filling approximately 129 acres. The Preliminary Engineering Report for East Timbalier Island Sediment Restoration projects was completed in October 1997 by Picciola & Associates, Inc. and submitted to LDNR, Coastal Restoration Division.

2.4 Authorization

The NMFS is the federal sponsor for implementation of the Central ETI restoration project, which was included on the Third Priority Project List (Louisiana Coastal Wetlands Conservation and Restoration Task Force, 1993b) and for East ETI restoration project on the Fourth Priority Project List (Louisiana Coastal Wetlands Conservation and Restoration Task Force, 1994). The sponsor's responsibility includes conducting the evaluation and other activities involved in final decision-

making in compliance for the National Environmental Policy Act (NEPA) of 1969. To meet NEPA compliance requirements, an EA must be conducted for each wetland project site that is modified or restored.

The East Timbalier Island Sediment Restoration project, identified as XTE-67 in the CWPPRA Restoration Plan (Louisiana Coastal Wetlands Conservation and Restoration Task Force, 1993a), is located in Lafourche Parish, Louisiana. The original project, selected for the Third Priority Project List, was expanded after Hurricane Andrew in 1992 and this additional work, identified as XTE-45/67B was selected for the Fourth Priority Project List. Both projects are classified as critical, short-term projects.

3.0 ALTERNATIVES INCLUDING PROPOSED ACTION

The projects' area and scope were identified by NMFS as part of Task Force submittals on the Third and Fourth Annual Priority Project Lists. These projects are two of several selected by the Task Force for the Terrebonne Basin.

Even though the two projects were approved in different years, the plans for restoration were developed simultaneously. A DNR-contracted Preliminary Engineering Report and Preliminary Construction and Contract Specifications for the East Timbalier Island Sediment Restoration projects were prepared by Picciola & Associates, Inc. in October 1997 (Contract No. 435CW-97-10).

The range of alternatives for meeting the restoration objectives for East Timbalier Island are discussed below. Consequences of the alternatives and proposed action are discussed in Section 5.0.

3.1 No-Action Alternative

The no-action alternative would fail to protect a valuable barrier island that provides and protects other resources in Louisiana. Specifically, failure to provide sediment input and shoreline stabilization of the island would not reduce the adverse impacts of shoreline erosion caused by over wash and from daily and low frequency waves and currents. Therefore, the various habitats and inhabitants of East Timbalier Island would disappear. With the loss of East Timbalier Island's protection, the back-side marshes would disappear rapidly. Higher salinity waters would intrude more easily into the coastal marshes, thus additionally stressing inland areas. Implementation of the no-action alternative is contrary to the recommendations of the Louisiana Coastal Wetlands Restoration Plan which were approved by the Task Force. Also, no action would be contrary to the recommendations in other long-term plans (Edwards et al., 1995; Gagliano, 1994; van Heerden, 1994) for protecting or restoring Louisiana's coastal wetlands. Failure to maintain East Timbalier Island would negate, in part, the need to understand the role of barrier islands in maintaining the integrity of the estuarine system (Reed et al., 1995).

Due to the public need to protect and restore East Timbalier Island, as evidenced by the public funding through the CWPPRA, the no-action alternative was not the preferred alternative.

3.2 Alternatives Considered

The four basic techniques - sedimentary, structural, vegetative, and hydrologic- involved in coastal engineering to achieve protection, restoration or creation of wetlands were considered. The first three of these were considered as remedies for the previously specified problems for East Timbalier Island Sediment Restoration projects. Hydrologic techniques were not considered feasible in this case as the scale needed is beyond the scope of technology and sources of funding. Sedimentary alternatives considered for fill placement in these projects included: (a) avoiding small isolated areas so as to reduce the edge subject to erosion, (b) extending or reinforcing the area already established by Greenhill, (c) constructing sand dunes to prevent small storm surges from overtopping the island, and (d) increasing the width of the island to prevent over wash and retain sand that might be lost from the system. Structural alternatives considered for the Gulf shoreline included: (a) placing rocks along the shoreline not already protected by the breakwater, and (b) repairing the existing breakwater. Structural alternatives for bay side of island, necessary to contain the fill and allow consolidation within the containment area, which were considered were: (a) geotextile tubes, and (b) riprap. Vegetative alternatives considered were (a) the species to be planted, (b) the method, (c) pattern, and (d) timing of planting.

Criteria for rejection of alternatives focused on the extreme conditions included within the project area. These include (1) high energy environment, resulting in dynamic physical nature of beach front, (2) frequency of strong storm events, (3) harsh conditions of increased salinities, drought, and high summer temperatures, and (4) remoteness of the project, increasing costs to potentially expensive alternatives. These factors alone, or in concert, limit the applicability of certain alternatives.

3.3 Preferred Alternative

This section presents the proposed action for these projects. The two projects contain multiple options for both fill and borrow areas. These include repair breaches in the island, fill shallow ponds, create marsh elevations, add width to the island, increase the elevation of the island, stabilize areas of the gulf and bay shoreline, and plant the created elevations with appropriate vegetation.

According to the specifications, construction sequence and general environmental constraints are as follows: (1) Dikes would be constructed with a dragline, using *in situ* materials. The gulfside containment areas being constructed prior to the bayside ones. (2) The dredged fill would be discharged within the contained area in a manner that would minimize overflow. (3) Impacts to vegetated areas would be avoided to the greatest extent practicable. (4) Impacts to wading birds or sea bird colonies during the nesting season would be avoided. (5) The sand fill would be shaped and graded so that the surface would be without humps and depressions and the side slopes would be uniform. (6) Riprap stabilization would be placed on the prepared slope, with geotextile fabric as specified. (7) The rubble mound revetment would be constructed with quarry stone over geotextile fabric and bedding stones. (8) All borrow sites would be offset a minimum of 120 meters (400 feet) from existing pipelines.

Utilizing the historical shoreline erosion rate and predictions of barrier island geologists, East Timbalier Island is predicted to revert to shoals by as early as 2004 (Reed, 1995) or 2025 (van Beek, 1993). Even with project construction, the

functional life of East Timbalier Island would be dependent on future physical conditions, such as waves, water levels, and subsidence. These projects were envisioned and funded knowing that likely they and the island would deteriorate within 20 years. It is hoped that within that time, the Barrier Island Study would have been completed and justification for the broad scale restoration of Louisiana barrier islands would have been developed. The continued presence of portions of East Timbalier Island would make a future decision for long-term maintenance barrier islands much more feasible and economical.

To maximize the available funds, project engineers developed an incremental bid package. Proposal A contains the minimum allowable design. Proposals B and C have incrementally larger dune components than Proposal A.

3.3.1 Marsh/Dune Platform

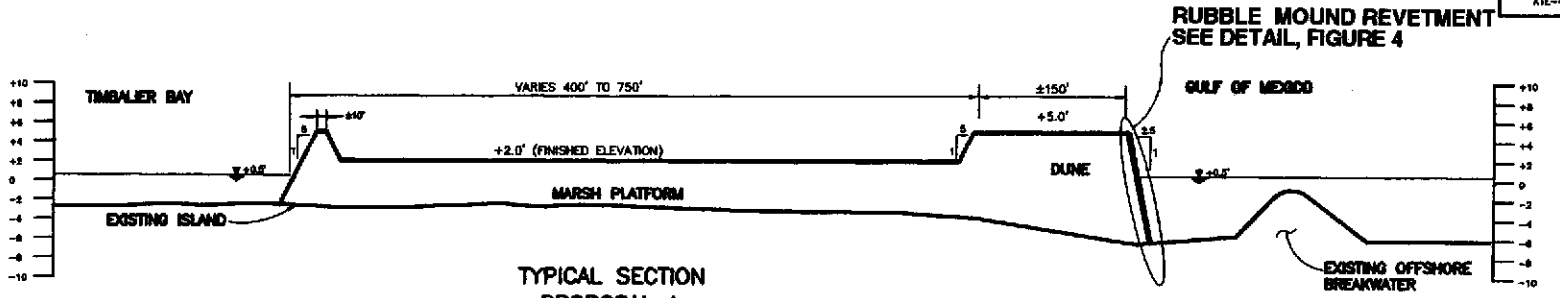
The marsh platform (Figure 3) would have a finished elevation of +2.0 feet NGVD. After settlement, the platform would be at an optimal elevation to support saltmarsh vegetation. The platform would serve also to collect overwashed or wind-blown sand. The marsh platform width would vary from ±120 to 225 meters (±400 to 750 feet) in Proposal A and approximately 83 hectares (205 acres) would be created. For Proposals B and C, the marsh platform would vary between ±105 to 210 meters (±350 and 700 feet) in width and approximately 79 hectares (195 acres) in size. An additional 10 hectares (25 acres) may be created in all alternatives due to sedimentation from the overflow weir structures.

Dunes (Figure 3) would prevent small storm surges and their associated waves from overtopping the island and would provide a reserve of sand during storm events. Increasing the elevation of the island would prevent channelization of water in lower areas and protect the marsh platform by suppressing increased water levels associated with storm events. The level of protection that could be constructed is dependent on the budget constraints and the unit cost for hydraulic fill. Proposal A would have a dune width of ±45 meters (±150 feet) which would cover about 14 hectares (35 acres). Proposal B and C would have a dune width of ±60 meters (±200 feet) which would cover about 18 hectares (45 acres). All proposals have a proposed dune height of +5.0 feet NGVD would provide protection corresponding to the surge height associated with a storm with a 12-year return period. About 240 acres of island habitat would be created by constructing any one of the three proposals.

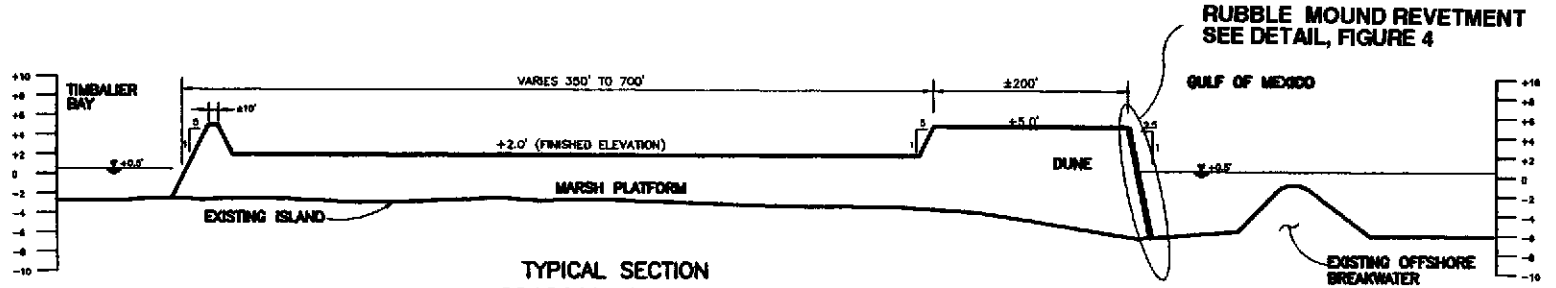
3.3.2 Gulf Shoreline Stabilization

Shoreline stabilization would be used in areas not already behind the existing offshore breakwater. A rubble-mound revetment (Figure 4), built on the existing or created slope of the dune, would provide direct protection to the gulf side of the island. The revetment would be built from -1.2 meters (-4.0 feet) NGVD to the crest elevation of the dune along a 2.5:1 slope from Stations 95+98 to 159+11 for Proposals A and B, and from Stations -4+31 to 7+49 and from 95+98 to 157+87 for Proposal C.

FEDERAL PROJECT NOS.	STATE PROJECT NOS.	ENGINEERING CONTRACT NO.	PARISH
XTE-67 XTE-45-678	TE-25 TE-30	435CW-97-10	LAFOURCHE

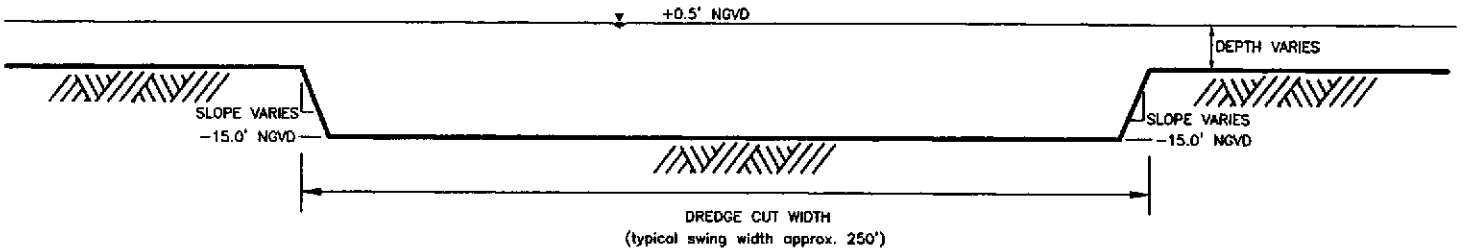


TYPICAL SECTION
PROPOSAL A



TYPICAL SECTION
PROPOSAL B AND C

SCALE
HORZ.: 1" = 200'
VERT.: 1" = 20'



TYPICAL CUT SECTION
OF BORROW AREA
N.T.S.

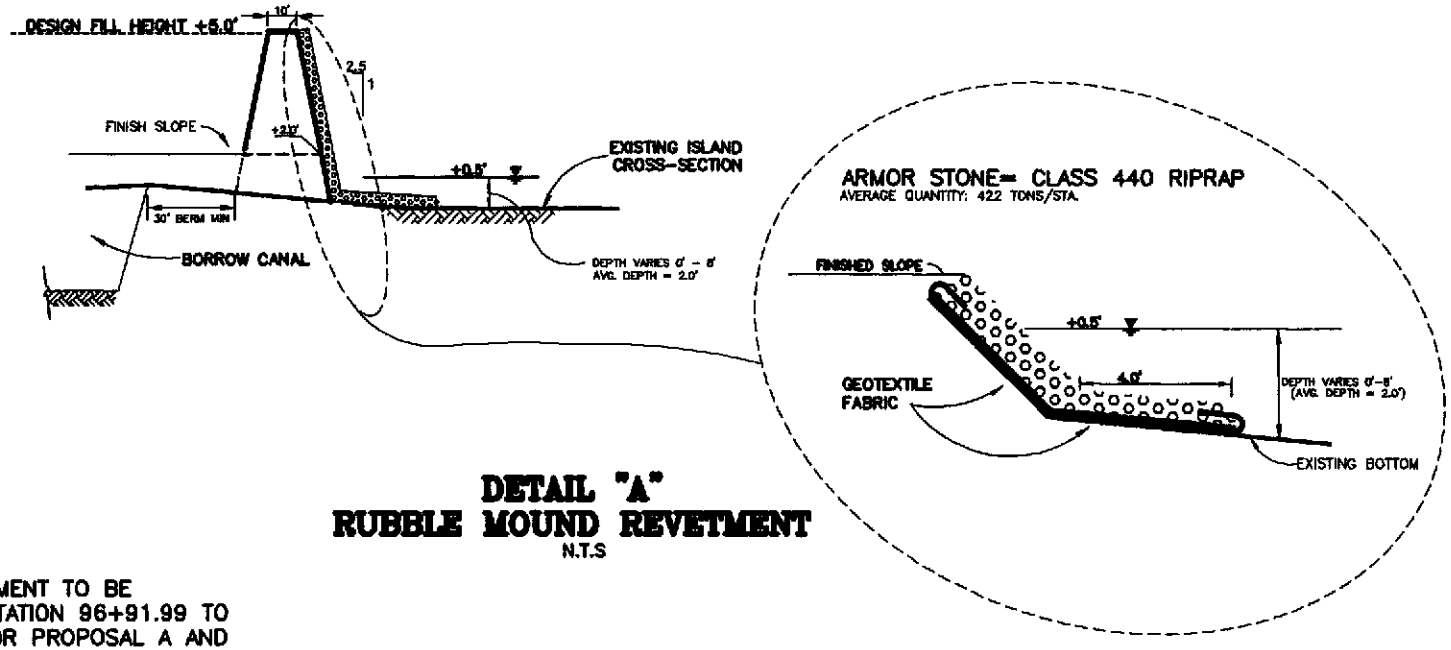
Figure 3

REVISIONS:		STAMP:	PICCIOLA & ASSOCIATES CONSULTING ENGINEERS & SURVEYORS CUT OFF, LOUISIANA	DATE: 02/06/98	DEPARTMENT OF NATURAL RESOURCES COASTAL RESTORATION DIVISION	SHEET NO. 7 OF 10
DATE	REMARKS		DESIGNED BY:	DRAWN BY: CGL	CHECKED BY: SAG	SCALE: AS SHOWN	EAST TIMBALIER ISLAND SEDIMENT RESTORATION PROJECTS TYPICAL CROSS-SECTIONS	

571-96: SECT.DWG

FEDERAL PROJECT NOS.	STATE PROJECT NOS.	ENGINEERING CONTRACT NO.	PARISH
XTE-67 XTE-46-679	TE-29 TE-30	4350*8-87-10	LAFOURCHE

Figure 4



DETAIL "A"
RUBBLE MOUND REVETMENT
N.T.S

NOTES:

1. RUBBLE MOUND REVETMENT TO BE CONSTRUCTED FROM STATION 96+91.99 TO STATION 159+11.62 FOR PROPOSAL A AND PROPOSAL B.
2. RUBBLE MOUND REVETMENT TO BE CONSTRUCTED FROM STATION -4+30.76 TO STATION 7+49.04 AND FROM STATION 96+91.99 TO STATION 159+11.62 FOR PROPOSAL C
3. REVETMENT ARMOR STONE: SHALL BE CLASS 440 RIPRAP.
4. GEOTEXTILE FABRIC TO OVERLAP A MINIMUM OF 2 FEET

REVISIONS: DATE	REMARKS	STAMP:	PICCIOLA & ASSOCIATES CONSULTING ENGINEERS & SURVEYORS CUT OFF, LOUISIANA	DATE: 02/06/98	DEPARTMENT OF NATURAL RESOURCES COASTAL RESTORATION DIVISION	SHEET NO. 8 OF 10
			DESIGNED BY:	SCALE: AS SHOWN	EAST TIMBALIER ISLAND SEDIMENT RESTORATION PROJECTS RUBBLE MOUND REVETMENT DETAIL AND SHORELINE STABILIZATION DETAIL	
			DRAWN BY: CGL	CHECKED BY: SAG		

571-96: REVET.DWG

A temporary borrow canal will be excavated to build containment dikes within the project area using *in situ* materials (Figure 4). This borrow area will be filled with the dredged material. The weight of the revetment armor stones (outer layer of heaviest rock) is determined by the design wave height, the slope of the structure, type of rock, and specific weights of the rock and water. Design wave heights are based on the forces a structure is designed to withstand within the limits of acceptable consequences and project investment. Armor stones would have an average weight of 440 pounds. Thickness of the rock layer will be approximately 1.1 m (3.5 feet). A bed layer of crushed limestone (6 inches thick) and geotextile filter cloth would be underneath minimizing the settlement of armor stones.

After careful consideration, the slope of the revetment was chosen to be 2.5:1. Steeper slopes would require larger armor stones and allow more wave runup (height of water measured from the existing water level, moving up the side of a structure due to the rush of waves) and overtopping (amount of water passing over the top of a structure per unit length measured in cubic feet per second), but a smaller construction area. More gentle slopes would reduce the necessary armor size and wave runup, but require a larger construction area.

3.3.3 Bay Shoreline Stabilization

During the fill and consolidation of the containment area, construction of a back containment dike would be necessary. Stabilization along the bay shoreline would be considered temporary and the objective would be to provide protection during high frequency (daily) conditions. Containment and stabilization would be achieved by constructing a sand levee to an elevation of +1.5 meters (5.0 feet) NGVD placed at an average depth of 0.6 meter (2.0 feet) below high tide. This would be adequate protection from frontal systems to the containment dike during construction.

Table 1 summarizes the cross-sectional components of the three proposals. Typical sections for the Proposals are shown in Figure 3.

Table 1. Summary of Final Design Cross-Sectional Components

Component	Proposal A	Proposal B	Proposal C
Dune Foreslope	1:2.5	1:2.5	1:2.5
Dune Height	+5' NGVD	+5' NGVD	+5' NGVD
Dune Width	±150'	±200'	±200'
Marsh Platform Hgt.	+2' NGVD	+2' NGVD	+2' NGVD
Marsh Platform Width	±400-750'	±350-700'	±350-700'
Rubble Mound Revetment	Yes	Yes	Yes
Revetment Length	6,300'	6,300'	7,500'
Project Area (acres)	240	240	240

3.3.4 Vegetation

Vegetation is an important element to barrier island restoration. Planting smooth cordgrass (*Spartina alterniflora*), marshhay cordgrass (*S. patens*), and Atlantic panic grass (*Panicum amarum*) by hand and rye grass (*Lolium* sp.) and Bermuda grass (*Cynodon* sp.) by air would be a component of all alternatives. The short germination time of Bermuda grass would potentially stabilize the dune surface until being out competed by endemic species. Atlantic panic grass would be planted on top of the dunes. Marshhay cordgrass would be the dominant species planted on the areas of the marsh platform not likely to be frequently inundated. Smooth cordgrass would be used on the backside of the island in areas that would likely experience frequent inundation after shaping and settlement. The rye and Bermuda grass seeds would be planted on the dune. All planted areas would be fertilized.

3.3.5 Borrow Sites

The Little Pass sand bar and adjacent water bottoms would be the borrow area for the restoration projects (Figure 5). The borrow site is approximately 5.5 miles from the easternmost extent of East ETI, therefore, depending on the size of the dredge, a booster pump may be required for much of the project area. Borrow areas, labeled A, B, and C (from north to south), met the selection criteria of sand composition greater than 70 percent. Poor material in core samples from the Penrod Slip, shallow water, and pipelines negated further geotechnical investigation in these areas.

Sites A and B have a large volume of sand available from 0 to 10 feet from the existing bottom. These areas are in shallow water and removal of sediment would require dredging over a large area, increasing the overall transport distance. Water depths at Site B are mostly greater than 5 feet, but the majority of Site A is shallower than 3 feet. This could create problems when mobilizing a dredge and may require dredging an access channel.

Site C comprises the largest sand volumes from 0 to 15 feet below the existing bottom. Water depths at Site C average between 6 and 8 feet deep so that dredging an access channel would not be required. Quantities of sand from the borrow sites are shown on Figure 5. Borrow areas would have minimal, if any, overburden based on the geotechnical investigation. Figure 5 also shows a typical cross-section of the borrow area. All borrow sites would be at least 400 feet from existing pipelines.

4.0 AFFECTED ENVIRONMENT

The East Timbalier Island Sediment Restoration projects are located on East Timbalier Island, one of the barrier islands west of the Caminada-Moreau headland which were formed by the deterioration of the Bayou Lafourche delta (discussed in Section I). The barrier islands are the seaward boundary of Lafourche Parish, the Timbalier Sub-basin of the Terrebonne Basin, and the State of Louisiana. The Timbalier Sub-basin contains 800,800 acres, including 278,800 acres of wetland and is south of Bayous Terrebonne and Blue, between Bayou du Large on the west and Bayou Lafourche on the east and north of the Gulf of Mexico (Louisiana Coastal Wetlands Conservation and Restoration Task Force, 1993b).

SAND SOURCE A COORDINATES

	POINT	X	Y
A-1	1	2288218.72	151087.80
	2	2302435.97	150988.78
	3	2310448.88	148849.03
	4	2311887.14	147928.24
	5	2311581.80	147668.60
	6	2310468.81	147435.28
	7	2310342.10	148388.87
	8	2310022.08	148928.02
	9	2309061.83	148605.24
	10	2309819.75	148275.83
	11	2310027.05	147215.85
	12	2308280.00	147260.10
	13	2308347.38	147748.79
	14	2308105.78	147873.49
	15	2308038.90	147411.09
	16	2307181.50	148530.32
	17	2306981.72	149228.63
	18	2306887.93	149830.17
	19	2288568.78	150880.25

SAND SOURCE B COORDINATES

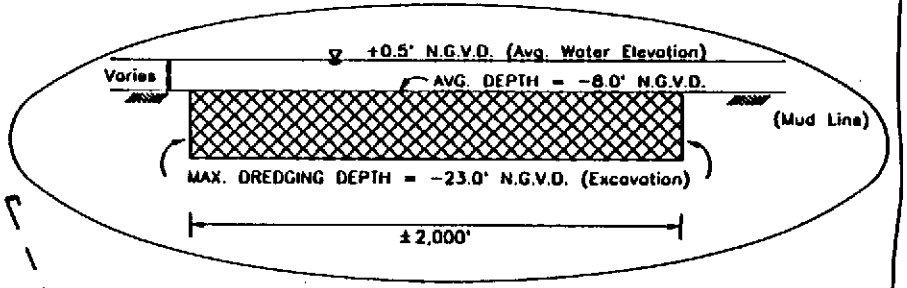
	POINT	X	Y
B-1	1	2304772.74	142018.28
	2	2308137.64	140361.74
	3	2308418.98	144547.49
	4	2307042.68	145205.58
	5	2304689.80	146982.37

SAND SOURCE C COORDINATES

	POINT	X	Y
C-1	1	2302538.82	147245.34
	2	2305853.40	144784.40
	3	2306080.84	142290.23
	4	2301812.08	144556.97
	5	2302305.15	145082.66
	6	2301353.88	146087.54

SAND SOURCE VOLUME SUMMARY

SAND SOURCE REGION	VOLUME (CU. YDS.) (0'-5' DEPTH)	VOLUME (CU. YDS.) (5'-10' DEPTH)	VOLUME (CU. YDS.) (10'-15' DEPTH)	TOTAL VOLUME (CUBIC YARDS)
A	4,188,098	2,527,372	--	6,715,370
B	672,350	198,682	--	871,032
C	2,031,780	1,992,108	1,201,992	5,225,938
TOTAL	6,890,228	4,718,120	1,201,992	12,810,340



Section A-A': Typical Borrow Area Section
Not to Scale

NOTES:

1. THERE ARE NO OYSTER LEASES WITH IN PROJECT AREA AND BORROW SITES.
2. CONTRACTOR SHALL NOT DREDGE BELOW 15' OF EXISTING BOTTOM.

571-96: SS-SUM2.DWG

PICCIOLA & ASSOCIATES
CONSULTING ENGINEERS & SURVEYORS
CUT OFF, LOUISIANA

DESIGNED BY: | DRAWN BY: KAP | CHECKED BY: SAG

DATE: 10-22-97

SCALE: 1" = 3000'

DEPARTMENT OF NATURAL RESOURCES
COASTAL RESTORATION DIVISION

EAST TIMBALIER ISLAND SEDIMENT RESTORATION PROJECTS
SAND SOURCE MAP

In 1993, East Timbalier Island consisted of 403 acres, approximately one/third of its maximum size (1,223 acres) which occurred in 1978 (van Beek and Debusschere, 1994). The island has a typical barrier island shape - long and narrow. Distinctive habitats of East Timbalier Island include the gulf-front beach, the dune ridge, the back-island saline marsh and tidal flats, various types of washover surfaces, and localized areas of back-island beach (Lombardo, 1992). There are no freshwater streams on the island. East Timbalier Island is bordered on the north by Timbalier Bay, on the east by Penrod Slip, on the west by Little Pass and on the south by the Gulf of Mexico (Figure 2).

Land loss rates are somewhat difficult to ascertain due to land ward migration of barrier islands. Lombardo (1992) showed annual areal changes on East Timbalier Island to be 7.5 hectares (18.6 acres). The island ranged from a low of 93 hectares (230 acres) in 1934 to a high of 495 hectares (1,223 acres) in 1978. Dunbar, Britsch and Kemp (1992) calculated land loss rates in Timbalier Bay for three time periods, 1930s to 1956-58, 1956-58 to 1974 and 1974 to 1983. They reported average loss in square miles per year for the Timbalier Bay quadrangle map as 0.21, 0.22 and 0.41 for the three time periods respectively. These maps include East Timbalier Island and the bay area north and east to the marshes fringing the mainland.

More dramatic than land loss rates are the predictions of when the barrier islands would disappear. McBride and Byrnes (1997) predict that within 30 years, East Timbalier Island would develop two breaches as the island narrows. They also predict that only a small fragment would remain by 2097. Other predictions are less optimistic. East Timbalier Island would disappear by 2025 according to van Beek (1993) or between 1996/97 (using loss rates from 1978-1988) and 2002 (using loss rates from the 1880s to 1988) according to Reed (1995) using McBride and Penland's data. From the topographic aerial photograph, taken in the summer of 1997, which Picciola & Associates, Inc. used in developing plans for construction, it is obvious that East Timbalier Island, still exists. However, the island is breached in numerous places. The largest of these gaps was created during Hurricane Andrew.

4.1 Physical Environment

4.1.1 Geology, Soils and Topography

East Timbalier Island is a flanking barrier island on the western side of Bayou Lafourche and the retreating headland formed when the bayou was the major distributary of the Mississippi River. The bayou's role as major distributary ceased approximately 300 years ago. Barrier shorelines formed in response to reworking of the abandoned delta, therefore, East Timbalier Island is composed of sediments from the Bayou Lafourche delta. The Bayou Lafourche barrier shoreline is one of the most rapidly eroding shorelines in the United States, and perhaps the world, due to land ward rollover and retreat (McBride and Byrnes, 1997).

The protective seawall along the southern border of East Timbalier Island makes it unique among barrier islands. Although storm surges cross over the seawall, it lessens the daily effects of wave action (increased protection). However, the seawall disrupts the natural wave action and has distorted the normal nearshore profile (increased erosion) so that sand carried by the longshore currents cannot be deposited on the beach (Ritchie et al., 1995).

The soils of all of East Timbalier Island and the back marshes are mapped as Felicity series (U.S. Department of Agriculture, 1984). The Felicity series

consists of somewhat poorly drained, rapidly permeable, saline, firm mineral soils that formed in sandy, tidal sediment along the Gulf of Mexico. These soils are on ridges and are frequently flooded with saltwater by high storm tides. Elevation ranges from about 0.3 to 1 meter (1 to 3 feet) above sea level.

Topographic relief of East Timbalier Island is low and defined by dunes, either primary accumulations (pioneer dunes) or dune terraces (sediment accumulations around pre-existing dunes or beach ridges) (Lombardo, 1992). Low-lying sandy flats are common and beach, salt flat, and swale habitats are present. The more stable areas are composed of beach, saltmarsh, salt flat, hummocky dune field, barrier grassland, and dike habitats (Ritchie et al., 1995).

4.1.2 Climate and Weather

East Timbalier Island lies in the humid sub-tropical climatic belt which runs along the gulf edge of the United States. It is characterized by long, hot and humid summers, and short, mild and humid winters. Mean average temperature is approximately 19^0 C (66^0 F) with average values of 14^0 C (56^0 F) and 28^0 C (82^0 F) for January and August, respectively. Temperatures of 32^0 C (90^0 F) or higher occur approximately 100 days between May and October. Average humidity is 62 percent during summer months and between 30 and 85 percent in the winter. Cold spells usually last no more than three days due to the dominance of warm gulf air moving inland from the coast year round. A winter temperature of 0^0 C (32^0 F) or less is expected 15 days per year and there is only a 20 percent chance of temperatures falling below -6^0 C (20^0 F) during the winter. Surface water temperatures along the island average 29^0 C (84^0 F) in late summer and 18^0 C (64^0 F)in winter.

Copious rains fall throughout the year as a result of the dominant coastal air masses moving inland and mixing with continental air. Rainfall is between 150 and 165 centimeters (59 and 65 inches) and heavy thunderstorms occur frequently. Less rainfall usually occurs in the fall months and snow only occurs at intervals of decades.

Severe storms are an integral part of the coastal environment. During the past 95 years, 55 tropical storms or hurricanes have made landfall in Louisiana, the latest being Hurricane Andrew in August 1992 (Stone et al., 1997).

4.1.3 Air Quality

Air quality over East Timbalier Island is good. Air masses are highly unstable in this area because of the convergence of the Gulf of Mexico and a landmass. There are no industrial or automotive air emissions in the area except for the small amount associated with the Greenhill Oil Company facilities.

4.1.4 Surface Water Resources

There are no freshwater surface waters (ponds, streams, etc.) on East Timbalier Island. However, Timbalier Bay waters surround the back

marshes and the Gulf of Mexico interfaces with the beach and crosses into Timbalier Bay where the island is breached. The designated uses for Timbalier Bay waters in the vicinity of East Timbalier Island are primary-contact recreation (e.g., swimming), secondary-contact recreation (e.g., fishing and boating), fish and wildlife propagation, and oyster propagation (Louisiana Department of Environmental Quality, 1997).

Timbalier Bay, including the back-bay marshes of East Timbalier Island, contain about 400 oil and gas wells (Miller, 1994), some of which began production in 1955 (Davis, nd). During the production of crude oil, condensates, or natural gas, water that is brought to the surface with the product stream is removed. The separated produced water (or oil-field brine) is re-injected into a well, or is discharged into surface waters. Produced waters are elevated in salinity, ranging from near the value of seawater (35 ppt) to as high as 200 ppt. There are seven locations of produced water discharges in the oil field land ward of East Timbalier Island in Timbalier Bay. Average discharges range from 100 to 1,000 bbl/day (one site), 5,000 to 10,000 bbl/day (three sites) and 10,000 to 50,000 bbl/day (three sites) (Rabalais et al., 1995). Produced water effluents also can contain organic compounds, elevated levels of trace metals and radium. Produced water discharges in this area are permitted by EPA under the NPDES General Permit for "Coastal" categories. A no-discharge compliance was to become effective January 1, 1997 (Rabalais et al., 1995).

Due to the proximity to the Gulf of Mexico, salinities in the area are high. Marsh vegetation is classified as saline (Chabreck and Linscombe, 1978, 1988, 1998). The salinity of saline marsh averages 16 parts per thousand (ppt) or approximately 46 percent of the Gulf salinity (U.S. Department of Agriculture, 1977). Salinities around the island are estimated to average 22 ppt (Louisiana Coastal Wetlands Conservation and Restoration Task Force, 1993c and 1994). A time series plot of mean monthly salinity at Grand Isle indicates that salinity was below 10 ppt only three times from 1955 to 1990 but reached 28 ppt or higher over 10 times during the same time period (Swenson and Swarzenski, 1995).

Coastal waters are rather turbid due to the suspended sediments in the longshore currents and from coastal erosion.

4.1.5 Storm and Flood Protection

East Timbalier Island is the outermost land area in eastern Lafourche Parish and acts as the first line of defense against seasonal cyclonic storms. The islands that fringe the coastal wetlands can limit the height of hurricane storm surges, reduce wave energy, reduce the potential for erosion of land ward wetlands, and retard saltwater intrusion (Guntenspergen and Vairin, 1996). Although East Timbalier Island, with its seawall, has historically protected the man-made structures behind the barrier from storm damage, significant breaching, and over wash was accomplished by Hurricane Andrew (Stone et al., 1994).

4.2 Biological Environment

4.2.1 Vegetative Communities

Vegetative communities on East Timbalier Island are typical of those normally found on a Louisiana barrier island. Beginning at the Gulf shoreline, vegetative communities include dune, levee, salt pan, sand flat, and marsh Vegetation plays an important role in building dunes by reducing wind velocity, thus causing the deposition of sand grains, and by the roots of dune plants binding the sand. Invader species along the beach forefront include beach purslane (*Sesuvium portulastrum*), sea rocket (*Cakile geniculata*), and beach morning glory (*Ipomea stolonifera*) (Reed, 1995). Dominant dune vegetation includes marsh hay cordgrass (*Spartina patens*), bitter panicum (*Panicum amarum*), seashore dropseed (*Sporobolus virginicus*), and beach morning glory (Ritchie and Penland, 1988). Constant sand movement, scarcity of nutrients and organic matter, rapid drainage of water and high evaporation rates limit the extent of vegetation on dunes.

Shrub species, including groundsell bush (*Baccharis halimifolia*) and wax myrtle (*Myrica cerifera*) are present on levees or dune ridges (Lombardo, 1992). What little vegetation is present in the salt pan and sand flat communities is dominated by glasswort (*Salicornia bigelovii*) and saltwort (*Batis maritima*). Back-marsh vegetation, subjected to tidal inundation and variable salinities, is dominated by marshhay cordgrass (40 percent) and smooth cordgrass (*Spartina alterniflora*) (35 percent), with salt grass (*Distichlis spicata*) (25 percent) (Lombardo, 1992). Black mangrove (*Avicennia germinans*) is present also (Williams, 1997). Ritchie and Penland (1988) noted that dune elder (*Iva imbricata*) and sea oats (*Uniola paniculata*) were present in their study area of the Caminada-Moreau coast which includes East Timbalier Island.

4.2.2 Fish and Wildlife Resources

Although few studies of fish and crustacean populations have been conducted around barrier islands, one is underway at East Timbalier Island (Williams, 1998). The objective of this study is to document the role of East Timbalier Island in providing a transitional, marine-estuarine habitat for fish and macrocrustaceans by testing if nekton assemblages differ by barrier island aquatic habitat. Aquatic habitats around barrier islands consist of the surf zone, ponds, lagoons, creeks, inlets, and back-island marshes.

Where the breakwater is above sea level, waters of the surf zone of East Timbalier Island are relatively calm with no or low-intensity breaking surf. Ross (1983) studied the surf zone of barrier islands in the Gulf of Mexico and reported that larval transients, juvenile transients, and larval residents composed the three patterns of fish residency in the surf zone. Most abundant were scaled sardine (*Harengula jaguana*), Gulf menhaden (*Brevoortia patronus*), anchovy (*Anchoa lyolepis*), and striped anchovy (*A. hepsetus*), sea catfish (*Aarius felis*), Atlantic threadfin (*Polydactylus octonemus*), rough silverside (*Menidia peninsulae*), tidewater silverside (*Menidia beryllina*), white mullet (*Mugil curema*), pompano (*Trachinotus carolinus*), Atlantic bumper (*Chloroscombrus chysurus*), Atlantic croaker

(*Micropogonias undulatus*), Gulf kingfish (*Menticirrhus littoralis*), and pinfish (*Lagodon rhomboides*).

Sand flats of Grand Terre, a Louisiana barrier island, have been documented as providing foraging and nursery habitat for Cyprinodontid fishes in general with highest utilization by longnose killifish (*Fundulus similis*) (Forman, 1968). Larval to adult longnose killifish were identified as the most common species of the nekton assemblage associated with an East Timbalier sand flat. Other species included in the assemblage were larval and juvenile inland silverside, white mullet, darter goby (*Gobionellus boleosoma*), and lesser blue crab (*Callinectes similus*) (Williams, 1998).

Deep water habitats represented by a tidal creek and channel were sampled on East Timbalier Island. Nekton communities that utilized the sand flat were also common to the tidal creek. A deep water channel through East Timbalier supported a nekton assemblage primarily of juvenile sand seatrout (*Cynoscion arenarius*) and adult hardhead catfish (*Arius felis*)with lesser amounts of adult brown shrimp (*Penaeus azetecus*), and squid (*Lolliguncula brevis*), and blue crab (*Callinectes sapidus*) (Williams, 1998).

Studies of fisheries species by Zimmerman (1988) on Grand Isle, by Thompson (1988) on Isle Derniers, and by Williams (1998) on East Timbalier Island revealed that nekton species collected from these barrier island marshes closely resemble species composition of mainland marshes.

The back-marshes of East Timbalier Island provide detrital material which forms the base of the food web in the Timbalier Bay estuary and contributes toward maintaining a high level of fisheries productivity in the northern Gulf of Mexico. Aquatic resources found near the project site include Atlantic croaker (*Micropogonias undulatus*), red drum (*Sciaenops ocellata*), sand seatrout (*Cynoscion arenarius*), spotted seatrout (*Cynoscion nebulosus*), southern flounder (*Paralichthys lethostigma*), gulf menhaden (*Brevoortia patronus*), spot (*Leiostomus xanthurus*), striped mullet (*Mugil cephalus*), brown shrimp (*Penaeus azetecus*), white shrimp (*Penaeus setiferus*), and blue crab (*Callinectes sapidus*) (Hoese, 1976). These resources are species of "national economic importance" in accordance with Section 906(e)(1) of PL 99-602, the Water Resources Development Act of 1986. These species vary in abundance from season to season due to their migratory life cycle. Most spawn offshore in the open Gulf of Mexico and enter Timbalier Bay as larvae or young juveniles to use the estuary as a nursery. Usually they return to the open gulf when sub-adults or adults.

In 1990, a census of wading birds and seabird nesting colonies was conducted in Louisiana. Twenty-seven species of colonial nesting waterbirds were studied (Martin and Lester, 1990). Two sampling sites, both located on the Calumet Island quad map, are near the project area. Station 051 is on the eastern end of Timbalier Island and station 049 is on the extreme eastern end of East Timbalier Island. During the 1983 survey, colonies of black skimmer (*Rynchops niger*) were identified as containing between 100 and 500 adult birds at station 049. None were reported in 1990 flight. Station 051 had very large numbers of birds (between 10,000 and 15,000) which included brown pelican (*Pelecanus occidentalis*), laughing gull (*Larus atricilla*), sandwich tern (*Sterna sandvicensis*), Least

tern (*S. antillarum*), royal tern (*S. maxima*), caspian tern (*S. caspia*), and black skimmer in 1976 and 1978. Numbers of birds observed decreased to between 1,000 and 5,000 during the 1983 and 1990 flights (Martin and Lester, 1990). Although both these sample sites are outside the project area, similar habitat areas occur on East Timbalier Island which might be colonized. Seabirds feed mostly in the shallow bays and use sandbars, barrier beaches, and marsh islands to nest.

The most recent rookery survey was taken in 1997 (Visser and Peterson, *in press*). Station 051, originally located on the western end of East Timbalier Island has migrated over time into Little Pass. Presently, it is closer to Timbalier Island. This area was used by 900 black skimmer, 550 royal terns, and 850 sandwich terns in 1997. Station 049 is a sand spit west of Penrod Slip, on the eastern end of East Timbalier Island. This site was inactive from 1985 to 1993 but was an active black skimmer colony in 1994 through 1996. It was not used in 1997, possibly because of on-going construction of a pipeline (Visser and Peterson, *in press*).

Scaup (*Aythya affinis*) are the only species of waterfowl that might be expected in large numbers near East Timbalier Island. They use Timbalier Bay for both resting and feeding on clams, snails, and crabs (Condrey et al., 1995).

Although no wading bird rookeries are listed on East Timbalier Island (Condrey et al., 1995, Martin and Lester, 1990), they could be expected to feed on small fish and invertebrates in the shallow bays and marsh ponds. Wetland birds, other than seabirds, wading birds, and waterfowl that prefer saline marshes, and therefore might visit the vicinity of East Timbalier Island, include American white pelican (*Pelicanus erythrorhynchos*), American bittern (*Botaurus lentiginosus*), and seaside sparrow (*Ammodramus maritimus*). Shore birds such as the piping plover (*Charadrius melodus)* and the sandpipers (*Calidris pusilla* and *C. mauri*) are seasonal (winter) inhabitants of barrier islands (Condrey et al., 1995). With the exception of the extreme southern portion of the active Mississippi River delta, East Timbalier Island and the other barrier islands provide the southernmost feeding and resting area for birds migrating south from Louisiana across the Gulf of Mexico. Likewise, the islands are the first land area encountered in Louisiana upon their return. Upland vegetation is important for perch and resting habitat.

Mangroves on East Timbalier Island provide a small area of habitat for some resident birds. The island also serves as stopover habitat for migratory birds for resting and refueling when flying in both northerly and southerly directions. The beach rim area is the first landfall north of the Mexican coast and during migration or inclement weather, large numbers of trans-gulf migrants seek refuge on elevated vegetation.

Both coyote (*Canis latrans*) and raccoon (*Procyon lotor*) are present on East Timbalier Island (Williams, 1997). Their presence could account for the absence of nesting colonies on the island. Nutria (*Myocastor coypus*) and rabbit (*Sylvilagus aquaticus*) would be expected, since they are present on Timbalier Island, but have not been reported on East Timbalier Island (Williams, 1997).

4.2.3 Threatened and Endangered Species

The current list of endangered or threatened species was reviewed as part of this assessment (U.S. Fish and Wildlife Service, 1992). The project area is in the defined range for eagles and sea turtles. Bald eagles (*Haliaeetus leucocephalus*) have been spotted feeding near East Timbalier Island; however, there are no nests in the immediate area.

East Timbalier Island marshes and open water areas may serve as foraging and development sites for the Kemp's ridley (*Lepidochelys kempi*) sea turtle. Dundee and Rossman (1989) report that Kemp's ridley occasionally appears along the Louisiana Gulf coast. Possible factors related to this occurrence include the widespread availability of shallow water marine and estuarine habitat with high turbidity levels from proximity to the Mississippi and Atchafalaya Rivers (Frazier, 1980).

To determine the extent to which a close by project, Point au Fer Island Hydrologic Restoration project (CWPPRA Project PTE 22/24), would affect the Kemp's ridley, literature documenting known occurrences within NMFS statistical zones along the Louisiana coast was examined and summarized in the environmental assessment (U.S. Department of Commerce, 1995). That assessment stated "no unusually high incidences of occurrence were noted in NMFS Statistical Zone 15 in general, or at Point au Fer Island specifically." East Timbalier Island is located in Statistical Zone 14 , is east of Point au Fer Island, and is removed from the turbid influence of the Atchafalaya River.

Of the other four species of endangered sea turtles, the loggerhead turtle (*Caretta caretta*) and the green turtle (*Chelonia mydas*) are relatively common in the nearshore waters of the Gulf of Mexico. The loggerhead feeds on sponges, jellyfish, mollusks, crustaceans, sea urchins, fishes, seaweeds and grasses while the green turtle's diet is primarily marine grasses and macrophytic algae. The hawksbill turtle (*Dermochelys coriacea*) is usually found in sea waters less than 15 meters (49 feet or 8 fathoms) and feeds on invertebrates, marine grasses and macrophytic algae. The leatherback turtle (*Dermochelys coriacea*) is found in deeper oceanic waters and feeds primarily on jellyfish (Condrey et al., 1995).

East Timbalier Island is located in Statistical Zone 14 which is composed of Lafourche, Terrebonne, and Jefferson Parishes. During the 10 year period from 1987 to 1997, there were 110 recorded strandings/sightings of all endangered turtles in this zone. In Lafourche Parish, one hawksbill, two leatherbacks, two greens, eight loggerheads, and 28 Kemp's ridleys were reported. There was one ridley reported in 1987 and 1992, 15 in 1993, nine in 1994, and two in 1996. These figures are not unusually high for the zone (Teas, 1998).

The piping plover, listed as a threatened species, winters in coastal areas of Louisiana (including East Timbalier Island) feeding on mud flats and beaches and roosting in sparsely vegetated areas during the winter months. The brown pelican, listed as an endangered species, has been observed feeding near East Timbalier Island, however, no nests have been reported.

4.3 Cultural Environment

4.3.1 Historical or Archaeological Resources

In the early 1700s, when the French initially settled in Louisiana, there was one group (Chitamacha) of Native Americans living along Bayou Lafourche. The Bayougoulas, who formerly lived in Iberville Parish joined the Houmas who eventually relocated to the coastal marshlands, some in lower Lafourche Parish. Therefore, it is possible that vessels of Native Americans utilized Bayou Lafourche and the waters around the Caminada-Moreau headland. During the 1700s and early 1800s, these Louisiana coastal marshes and barrier islands were populated by privateers and pirates (McKenzie, et al., 1995).

Due to the dependence on ship travel during the colonization of south Louisiana and the frequency of tropical storms in the area, there is the potential that historical ship remains may be located beneath the sediments that have accumulated during the past. The likelihood of settlement or shipping artifacts, either Native American or European, being found is remote because of the land ward migration of East Timbalier Island.

4.3.2 Economics (Employment and Income)

Wetlands on East Timbalier Island are valuable as forage, cover, and nursery habitat for the diverse and abundant assemblage of finfish and invertebrates that are harvested by Louisiana's commercial and recreational fishermen. About 90 percent of the fish harvested from the Gulf of Mexico rely on aquatic habitats such as those found in the back marshes of East Timbalier Island and Timbalier Bay.

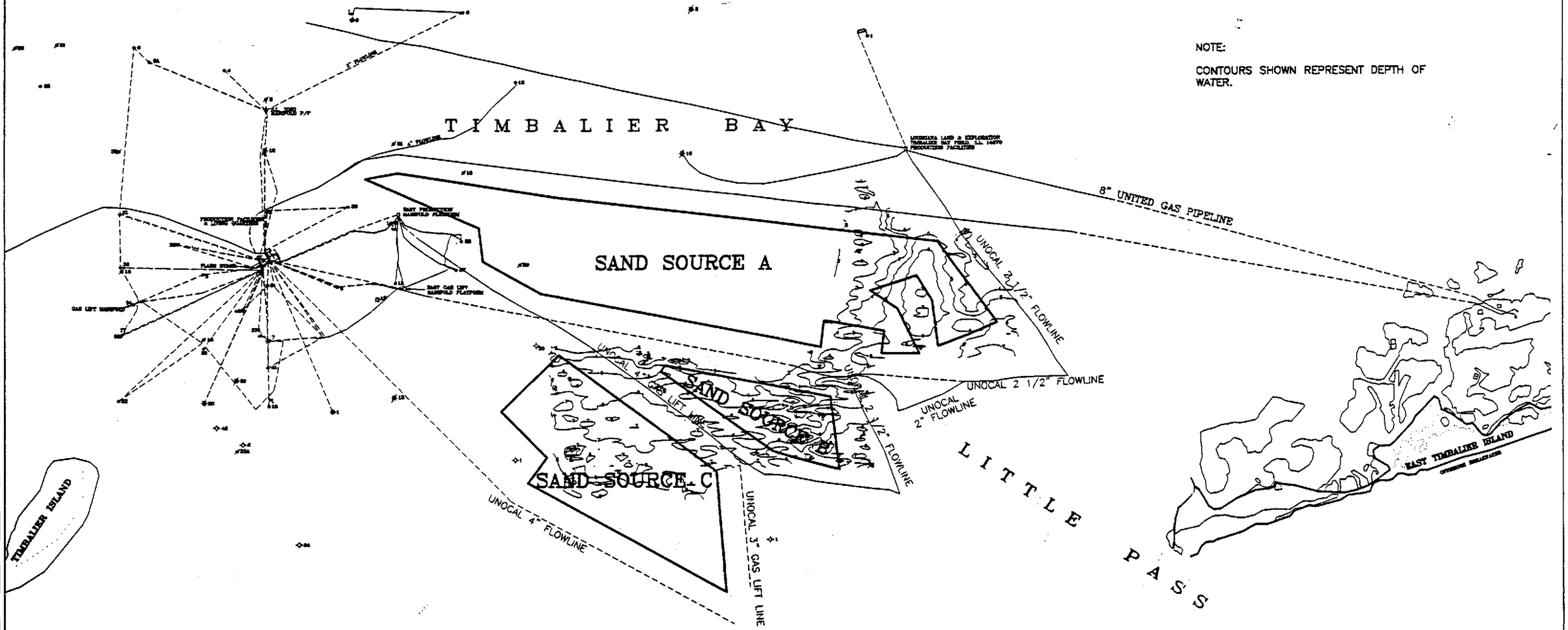
East Timbalier Island is located between Dulac-Chauvin and Golden Meadow-Leeville, Louisiana, which are two of the top forty ports in the United States for quantity of commercial fishery landings. These two areas reported 163.2 million pounds of fishery products landed in 1995; 234.2 million pounds in 1994; and 142.0 million pounds in 1993 (U.S. Department of Commerce, 1996). For value of commercial fishery landings the same two ports are listed in the top 20 in the United States. Dockside value at these ports was $74.2 million in 1995; $85.1 million in 1994; and $84.7 million in 1993 (U.S. Department of Commerce, 1996).

In addition to the economic impact from the commercial fishing industry, revenue is generated from recreational wildlife and fisheries activities on or near East Timbalier Island. Many businesses in Terrebonne and Lafourche Parishes market equipment, bait, food, and gas necessary for trips to East Timbalier Island. Because of the high salinity, there are no oysters, therefore, no oyster leases are near East Timbalier Island.

Oil and gas exploration has been conducted in Timbalier Bay near East Timbalier Island since the 1930s. (Note location of wells shown in Figure 6.) The first lease for oil and gas exploration in the vicinity of East Timbalier Island was granted in 1928. Gulf Refining Company (later Gulf

SAND SOURCE VOLUME SUMMARY

SAND SOURCE REGION	VOLUME (CU. YDS.) (0'–5' DEPTH)	VOLUME (CU. YDS.) (5'–10' DEPTH)	VOLUME (CU. YDS.) (10'–15' DEPTH)	TOTAL VOLUME (CUBIC YARDS)
A	4,186,098	2,527,272	--	6,713,370
B	672,350	198,682	--	871,032
C	2,031,780	1,992,166	1,201,992	5,225,938
TOTAL	6,890,228	4,718,120	1,201,992	12,810,340



NOTE:

CONTOURS SHOWN REPRESENT DEPTH OF WATER.

FIGURE 6

SAND SOURCE SUMMARY

PICCIOLA & ASSOCIATES
CONSULTING ENGINEERS & SURVEYORS
CUT OFF, LOUISIANA

Oil Company) acquired the lease in 1936. The lease is now owned by Greenhill Petroleum Corporation (Picciola & Associates, Inc., 1997a).

At least eleven pipelines have been constructed in the vicinity of East Timbalier Island to accommodate the production of minerals from local and offshore wells (Picciola & Associates, Inc., 1997a). They range in size from 5 to 50 centimeters (2 to 20 inches) in diameter. The pipelines are owned by Tennessee Gas Pipeline (2), Koch-Gateway Pipeline, (1), Chevron Pipeline (3), Greenhill Petroleum (2) and UNOCAL (3).

Parish revenues and employment resulting from oil and gas exploration and production on and near East Timbalier Island reached their highest level between 1970 and 1985. Following the decline in the oil and gas industry since the mid-1980s, the economic benefits resulting from oil and gas exploration have decreased also.

4.3.3 Land Use

According to a notice published in the Federal Register (Vol. 34, No. 73-Thursday, April 17, 1969) Executive Order No. 718, which established East Timbalier Island Reservation be "reserved and set apart for the use of the Department of Agriculture as a preserve and breeding ground for native birds", was revoked. Louisiana State Land Office and the U.S. Department of the Interior are listed as owners of the property. Greenhill Petroleum Corporation leases water bottoms in the vicinity; Louisiana Land & Exploration Co. and Louisiana State Land Office are adjacent land owners.

There are no residential, commercial or industrial uses on East Timbalier Island except the elevated production facilities, owned by Greenhill Petroleum Corporation located at the extreme eastern and western ends of the island.

4.3.4 Recreation

The diverse habitats of the barrier island and the surrounding bay and gulf waters make barrier islands high quality recreation areas. East Timbalier Island is heavily utilized by recreational fishermen, and frequented by bird watchers. Access to East Timbalier Island is by boat only, usually launched from Bayou Lafourche at Leeville or Port Fourchon.

4.3.5 Noise

East Timbalier Island is a state-owned, remote area that has no industry other than oil wells and oil production facilities. Ambient noise in the area would result from oil and gas exploration and production, boats, campers, or wildlife.

4.3.6 Infrastructure

The protective seawall/breakwater and groins which practically surround East Timbalier Island are the most visible structures. Oil and gas access canals and pipelines occur in the back marshes or are buried.

5.0 ENVIRONMENTAL CONSEQUENCES

The adverse environmental consequences of the no-action alternative are extensive compared to the benefits of the preferred alternative. East Timbalier Island would continue to erode and is predicted to become a sand shoal within 25 to 100 years. Without the presence of the barrier island, rates of marsh loss around Timbalier Bay could increase. The tidal prism would increase as marshes are lost and barrier islands degrade. All structural and non-structural alternatives, including the preferred, have short-term localized impacts during construction, yet offer highly significant long-term environmental benefits.

Selection of construction alternatives and the location and type of fill material were evaluated from both an engineering and cost viewpoint. A thorough assessment of the environmental consequences of the preferred alternative is, therefore, provided below.

5.1 Physical Environment

5.1.1 Geology, Soils and Topography

The proposed activity will have minimum impact on geology or soils of East Timbalier Island. The topography would be restored to more closely resemble that prior to Hurricane Andrew, since the large breach would be filled as well as smaller breaches and some open water areas. Rubble mound revetments would be constructed along the gulf shoreline in places no longer protected by the seawall/breakwater.

Materials dredged from Timbalier Bay borrow locations would be used to construct elevated dunes, containment dikes and marsh platforms. The dredged material consists of naturally occurring material deposited in Timbalier Bay over time by marine processes from the deterioration of the Caminada-Moreau headlands. The sources of this material are expected to be identical to the sources of sediment-laden longshore currents around East Timbalier Island. No potential for contamination is anticipated by use of these sediments since the headland area has little or no industrial activity. Borrow areas would be a minimum of 122 meters (400 feet) from pipelines near East Timbalier Island and to depths of less than 4.5 meters (15 feet).

Material used for construction of the shoreline stabilization (armor stones and limestone would be free of contaminants. Impacts from dredging and construction would be minimal, localized, and short-term. Dredged materials removed from borrow areas could be replaced by natural processes within 5 to 10 years, depending upon the frequency of storm events .

5.1.2 Climate and Weather

The East Timbalier Island Sediment Restoration projects are not designed to withstand hurricane conditions and could be damaged by such events. Restoration of East Timbalier Island would provide increased protection from storms over present conditions. Inclement weather could temporarily delay the implementation of the proposed activity. The areas filled with

dredged material would be planted after compaction and should vegetate, and remain unaffected by normal weather conditions.

5.1.3 Air Quality

Minor adverse impacts would result from the proposed activity. Exhaust emissions from construction equipment should be quickly dissipated by prevailing winds and be limited to the construction phase of the project.

5.1.4 Surface Water Resources

Short-term adverse impacts to surface water resources would be limited to the designated dredge sites in Timbalier Bay and fill areas for the elevated dunes, containment dikes, and marsh platform. Increased turbidity, especially in the vicinity of the overflow weir box would occur during construction. These impacts are minor and would be limited to the construction phase of the project. There are no oyster beds in the immediate vicinity of any proposed construction.

The long-term benefits to surface water resources resulting from the proposed activities include: (1) protection to shallow water areas behind East Timbalier Island, (2) maintenance or reduction in salinities by reducing the tidal exchange within the bay, (3) increased protection from storm surges, and (4) creation of wetlands that provide important water quality functions such as pollutant and sediment removal and floodwater retention.

The Wetland Valuation Assessment (WVA) team estimated the Central East Timbalier Island project would create 86 acres of barrier island habitat and East East Timbalier Island would create 129 acres. (Louisiana Coastal Wetlands Conservation and Restoration Task Force, 1993c and 1994).

5.1.5 Storm and Flood Protection

The proposed activity would improve long-term storm and flood control resources East Timbalier Island. This barrier island is the outermost land area in the eastern Terrebonne Basin and acts as the first line of defense against seasonal cyclonic storms. Widening and constructing dunes would improve the capacity of the island to buffer tidal surges, thereby providing protection for mainland areas.

5.2 Biological Environment

5.2.1 Vegetative Communities

The proposed activity would result in positive long-term impacts on vegetative communities within the project area of East Timbalier Island. Re-establishing the marsh platform would create elevations conducive to the establishment of marsh vegetation. Establishing dune vegetation would increase the overall health, diversity, and stability of the island.

5.2.2 Fish and Wildlife Resources

Short-term adverse impacts to fish and wildlife would occur during the construction phase of the project. These impacts include impingement of slow-moving fishes and benthic animals during dredging, and smothering of non-mobile benthic organisms in the deposition sites. Increased turbidity would occur in waters near the designated dredge and fill sites. These impacts are minor and would be limited to the immediate vicinity of action and only for the duration of construction of the project.

Areas in Timbalier Bay used as a source for dredged material would have brief localized impacts due to dredging and localized increases in turbidity. Since these areas would be no closer than 400 feet from existing pipelines and would involve less than 15-foot depths, impacts would be minimal. Due to sediments carried by longshore currents, the dredged areas could be replenished with natural material within 5 to 10 years, depending upon the frequency of storm events.

Although there will be a loss of aquatic habitat by filling, the proposed activities would improve fishery resource habitats by re-establishing the marsh platform. Stabilizing and restoring the inland would reduce marsh deterioration attributed to erosion and tidal scour. Detrital material, formed by the breakdown of emergent vegetation, would contribute to the aquatic food web of Timbalier Bay and near-shore Gulf of Mexico ecosystems. In addition to benefiting fishery resources, dune areas would provide critical habitat for wildlife species during storm events or flooding.

No colonies of sea or wading birds are listed on the 1997 field survey which included East Timbalier Island (Visser and Peterson, *in press*). Since the projects would not be constructed during nesting season, it is unlikely that these birds would nest in an area of disturbance. The creation of new habitat would be conducive for nesting in future years.

5.2.3 Threatened and Endangered Species

Although bald eagles have been sighted in Timbalier Sub-Basin, no adverse impacts would be anticipated to this threatened species due to the absence of nesting sites within the project area. The Kemp's ridley and other sea turtles probably would avoid increased turbidity and activity surrounding construction sites, thus no adverse impacts would be anticipated to these species. The piping plover utilize East Timbalier Island during the winter months. However, construction of this project is scheduled to occur during the summer months, thus not interfering with the plover's feeding or roosting sites, but will increasing habitat for the piping plover. Brown pelicans probably would avoid increased turbidity and activity surrounding construction sites, thus no adverse impacts would be anticipated to this endangered species.

5.3 Cultural Environment

5.3.1 Historical or Archaeological Resources

No impacts would be anticipated to historical or archaeological resources within the project area.

5.3.2 Economics (Employment and Income)

No adverse impacts to economic resources would result from the proposed activity. Continued protection to oil and gas wells and production facilities would be provided by restoration of East Timbalier Island.

5.3.3 Land Use

No impacts to current land use would result from the proposed activity.

5.3.4 Recreation

Some temporary adverse short-term impacts to recreation would occur as a result of filling and construction activity. These include having to avoid fill areas until compaction and re-vegetation, increased turbidity of surface waters and increased noise within the project area during the time of construction. Restoration would increase land area, thus enhancing recreation.

5.3.5 Infrastructure

No adverse impacts to regional infrastructure are anticipated. Buried pipelines would be protected by the increased height and width of East Timbalier Island.

6.0 CONCLUSIONS

This EA finds that no significant adverse environmental impacts are anticipated by the implementation of the East Timbalier Island Sediment Restoration projects. This conclusion is based on a comprehensive review of relevant literature, site-specific data, and project-specific engineering reports. This finding supports the recommendation of the NMFS, the sponsoring agency, and the CWPPRA Task Force. As evidenced by their funding, the State of Louisiana supports the projects. Restoration of barrier islands has been encouraged by the Terrebonne and Lafourche Parish governments, and the general public. The natural resource benefits anticipated from the implementation of the East Timbalier Island Sediment Restoration projects would enhance and sustain the diverse ecosystem found within the Terrebonne Basin.

7.0 PREPARERS

This EA was prepared by GOTECH, Inc. under contract to NMFS. Mr. Bruce Dyson of Gotech, Inc. handled administrative duties and Ms. Peggy Jones wrote the text. C-K Associates, Inc. prepared the color figures and Picciola & Associates supplied the engineering drawings. Direction and guidance was provided by Dr. Teresa McTigue of NMFS, Ms. Dianne Lindstedt of Louisiana State University, and Mr. John Foret of the University of Southwestern Louisiana. In addition, invaluable reference material and guidance were provided by Mr. Rickey Ruebsamen, Mr. Tim Osborn, Dr. Erik Zobrist, Mr. Patrick Williams and Mr. Greg Miller of NMFS.

8.0 FINDING OF NO SIGNIFICANT IMPACT

Based on the conclusion of this document and the available information relative to the East Timbalier Sediment Restoration projects, there would be no significant environmental impacts from this action. Furthermore, preparation of an Environmental Impact Statement on this action is not required by the National Environmental Policy Act or its implementing regulations.

Roland A. Schmitten
Assistant Administrator for Fisheries
National Marine Fisheries Service

AUG 20 1998
Date

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APPENDIX
A

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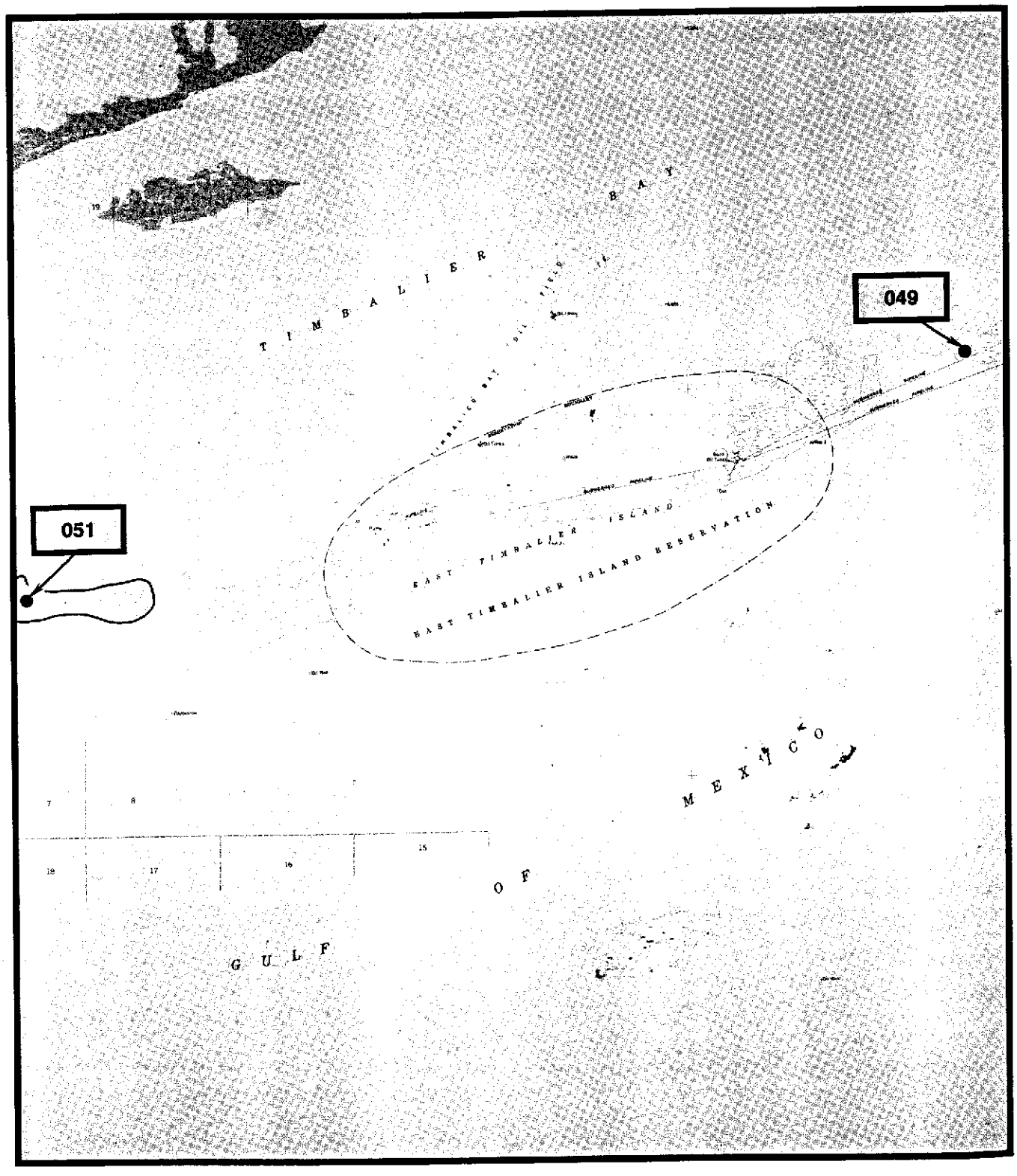
APPENDIX
B

1997 Seabird Nesting Species Codes

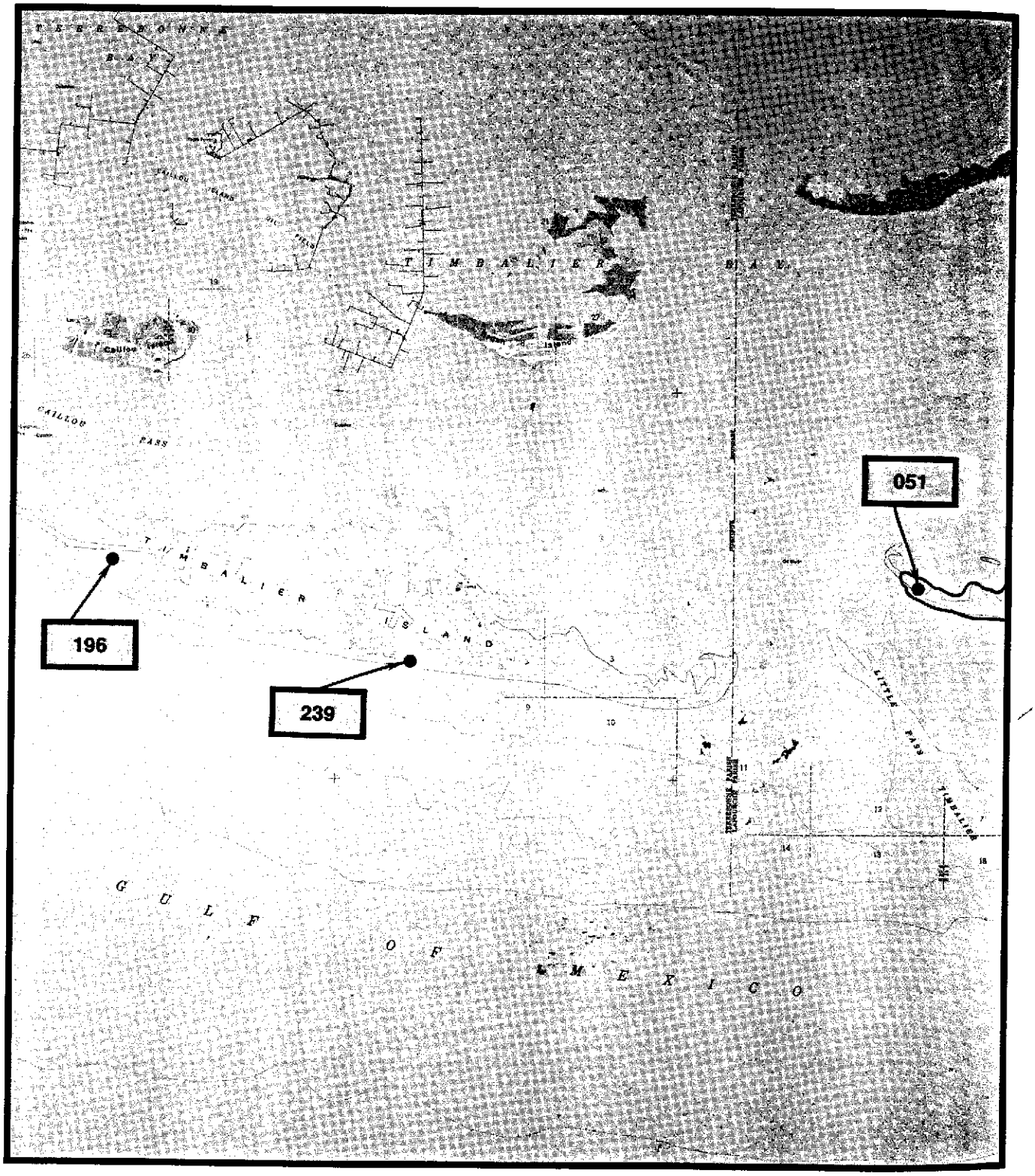
CODE	SPECIES
	Seabirds and Pelicans
BP	Brown Pelican
LG	Laughing Gull
HG	Herring Gull
BS	Black Skimmer
FT	Forster's Tern
LT	Least Tern
RT	Royal Tern
SN	Sandwich Tern
CT	Caspian Tern
GT	Gull-billed Tern
CO	Common Tern
	Waders and other birds
SE	Snowy Egret
GE	Great Egret
RE	Reddish Egret
CE	Cattle Egret
TH	Tricolored Heron
GB	Great Blue Heron
LB	Little Blue Heron
BC	Black-crowned Night Heron
WI	White Ibis
PI	Glossy and/or White-faced Ibis
RS	Roseate Spoonbill
AO	American Oystercatcher
NH	Common Nighthawk
BG	Boat-tailed Grackle

OSRADP number	LNHP number	USFWS number	Latitude	Longitude	Survey date	Activity Status	Seabirds and Pelicans	Nesting Habitats	Comments	Waders and other birds
254B-04	299	(LOOP N18)	29 11.565	90 18.004	21-May	active	500 LG, 400 FT, 150 BS, 30 CT	FT wrack, LG marsh, BS and CT shell	colony on two islands; most on northernmost island	
254B-05	298	(LOOP N16)	29 10.357	90 17.795	21-May	active	700 LG, 150 FT	FT wrack, LG and TH marsh		30 TH
254B-06	300	(LOOP N17)	29 11.572	90 19.509	21-May	island gone			island gone (submerged shell reef)	
254B-07	408 ?		29 08.699	90 20.857	21-May	active	250 BS, 150 LG	BS shell; LG marsh; TH	all on N end of island	20 TH
254B-08	409 ?		29 08.290	90 21.031	21-May	active	100 FT	wrack	South end of island	
254C-01	239	602053	29 03.395	90 26.052	26-Jun	active	30 LT	washover	raccoon observed	
254C-02	196		29 04	90 29	26-Jun	none				
254C-03	51 and 405 ?	602042	29 04.531	90 24.192	2-Jul	active	900 BS, 850 SN, 550 RT	sand	BS on ends; terns in center (this island/bar has migrated W and N of original location)	
254D-01	049	602099	29 05.331	90 16.021	2-Jul	none				
255A-01	241		29 08	90 09	2-Jul	none			no suitable habitat	
255B-01	341	602044	29 09	90 07	2-Jul	none			no suitable habitat	
255B-02	269		29 15	90 02	22-May	none				
255B-03	286		29 10.223	90 04.790	3-Jul	active	800 LT	sand/shell washover		2 NH
255B-04	317 ?	(LOOP N35)	29 13.434	90 02.328	22-May	none				
255C-01	026	602043	29 06.822	90 10.206	2-Jul	active	370 LT	sand/shell washover	scattered along length of Bay Champagne washover and E (2-mile stretch of beach)	4 NH
255C-02			29 07.448	90 11.648	1-Jul	new	50 LT	dredged fill material	in empty lot N of R&C Supply store on Fourchon Road	
257B-01	283		29 14	89 33	16-Jul	none				

Calumet Island



Timbalier Island



APPENDIX C

KATHLEEN BABINEAUX BLANCO
LIEUTENANT GOVERNOR

State of Louisiana

OFFICE OF THE LIEUTENANT GOVERNOR
DEPARTMENT OF CULTURE, RECREATION & TOURISM
OFFICE OF CULTURAL DEVELOPMENT
DIVISION OF ARCHAEOLOGY

PHILLIP J. JONES
SECRETARY

GERRI HOBDY
ASSISTANT SECRETARY

March 12, 1998

Dr. Teresa McTigue
U.S. Department of Commerce
National Marine Fisheries Service
Southeast Fisheries Center
Lafayette Office
U.S.L.
P.O. Box 42451
Lafayette, Louisiana 70504

Re: Environmental Assessment
East Timbalier Island Restoration Projects (XTE-67, XTE-45/67b)
Lafourche Parish, Louisiana

Dear Dr. McTigue:

Reference is made to your letter dated February 27, 1998, which was received on March 3, 1998, concerning the above. A review of our files indicates that there are no sites or properties either listed on or which have been determined eligible for listing on the National Register of Historic Places in the proposed project area. In addition, there are no other known cultural resources in this area. As such, we feel that the proposed project will have no effect on significant cultural resources, and we have no objections. However, should any archaeological material be uncovered during ground altering activities, we request that work in that area be halted and this office be notified immediately.

If we may be of further assistance, please contact Mr. Mike Mahady in the Division of Archaeology at (504) 342-8170.

Sincerely,

Gerri Hobdy
State Historic Preservation Officer

GH:MM:s

c: Mr. Stehle Harris
Louisiana Department of Natural Resources
Coastal Restoration Division
P.O. Box 94396
Baton Rouge, Louisiana 70804-9396

United States Department of the Interior

FISH AND WILDLIFE SERVICE
825 Kaliste Saloom Road
Brandywine Bldg. II, Suite 102
Lafayette, Louisiana 70508

March 26, 1998

Teresa McTigue, Ph.D.
National Marine Fisheries Service
Southeast Fisheries Center
U.S.L., Post Office Box 42451
Lafayette, Louisiana 70504

Dear Dr. McTigue:

In response to your March 24, 1998, letter, the U.S. Fish and Wildlife Service has reviewed the Environmental Assessment (EA) for the East Timbalier Island Restoration Projects (XTE-67, XTE-45/67b). Those projects are funded via the Coastal Wetlands Planning, Protection and Restoration Act of 1990. The following comments are submitted under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). and the Endangered Species Act of 1973, as amended.

General Comments

The EA, which represents a revision of the EA provided by your office on March 2, 1998, is generally well written and comprehensive. We are pleased that the current EA satisfactorily addresses most of the comments transmitted in my March 5, 1998, letter.

Specific Comments

Page 8, Figure 2 - This figure would be improved if it more clearly illustrated the areas of project construction.

Page 24, paragraph 2 - The survey by Peterson (1997) should be cited in Appendix A.

Page 32, section 5.2.3 - We concur with your conclusion that the proposed action is not likely to adverse affect endangered or threatened species that may occur in the project area.

As a final note, we re-iterate that caution be exercised to ensure that adult birds, eggs or young occurring in any newly established wading bird or seabird colonies are not harmed by construction activities; this generally means staying 1,500 feet away from those colonies during the nesting season. Illegal take of migratory birds, including colonial wading birds and seabirds, is prohibited by the Migratory Bird Treaty Act and associated regulations.

The Service appreciates the opportunity to comment on the EA. If you have any questions regarding our comments, please contact me or Deborah Fuller of this office.

Sincerely,

David W. Frugé
Field Supervisor

cc: NMFS, Baton Rouge, LA

via Facsimile

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
9721 Executive Center Dr. N.
St. Petersburg, FL 33702

MAY 14 1998

F/SER3:CCC:jbm

Teresa McTigue, Ph.D.
Fisheries Biologist
Lafayette Office
Southeast Fisheries Center, NMFS
U.S.L., P.O. Box 42451
Lafayette, Louisiana 70504

Dear Dr. McTigue:

We have reviewed the Environmental Assessment (EA) forwarded to us on February 27, 1998 regarding the East Timbalier Island Restoration Projects (XTE-67, XTE-45/67b) in LaFourche Parish, Louisiana. These projects will use material dredged from Timbalier Bay to fill breaches and shallow ponds. An elevated dune and stabilization structures will be constructed to reduce erosional effects of waves and currents. Existing marshes will be protected and new marshes will be created. The National Marine Fisheries Service (NMFS) is the sponsoring agency and is one of five Federal agencies involved in the development of these projects to implement the Coastal Wetlands Planning, Protection, and Restoration Act of 1990. Your transmittal letter requested consideration of the effects of this project on listed species under NMFS jurisdiction, pursuant to Section 7 of the Endangered Species Act of 1973 (ESA). For the reasons discussed below, we believe that sea turtles and Gulf sturgeon, the only listed species under NMFS jurisdiction likely to be present in the project area, are not likely to be adversely affected by these projects.

East Timbalier Island is the easternmost barrier island in the chain of islands that occur south-southwest of New Orleans. The EA prepared for these projects identifies previous attempts that have been made to stabilize East Timbalier Island. Dirt levees were built on East Timbalier Island to protect oil and gas operations in the 1950s, and two groins were built to stabilize East Timbalier Island after Hurricane Betsy in 1965. The groins were extended, an additional groin was constructed, and a seawall was built parallel to the beach, joining the three groins offshore. By 1974, 16 kilometers (10 miles) of seawalls had been constructed with 30 meters (100 feet) long groins constructed every 60 meters. This seawall was scattered during a hurricane in 1974, and five breaches of the island were established. A blow-out and associated oil spill occurred on September 29, 1992. Mitigation measures resulting from the oil spill included the creation of marsh elevations. Wetland creation began, with mixed success, in December 1993.

These projects are designed to extend the life of the remaining portion of East Timbalier Island. Dikes will be constructed, fill will be placed and graded in a manner that avoids vegetated areas

and minimizes overflow into the Gulf and bay, riprap will be constructed on prepared slopes and rubble mound revetments will be created for these projects. Dredge material for the fill will be collected in the Timbalier Bay, while maintaining an offset of 120 meters from pipelines. Without implementation of this project, the East Timbalier Island is considered likely to revert to shoals shortly. Even with project construction, the island is likely to deteriorate within 20 years.

A hydraulic pipeline dredge will be used to collect and place material from Timbalier Bay onto the island. These slow dredges are not likely to impinge strong swimmers such as sea turtles and Gulf sturgeon. Localized and short-term increases in turbidity can also be avoided by turtles and sturgeon. Effects on their benthic prey species will also be short term and localized, and sufficient prey will remain available nearby. Ultimately, fishery resource habitats in Timbalier Bay and the nearshore Gulf of Mexico may be improved by marsh creation associated with these projects. Therefore, we believe listed sea turtle species and Gulf sturgeon may eventually benefit from this restoration effort and are not likely to be adversely affected by these projects.

This concludes consultation responsibilities under Section 7 of the ESA. However, consultation should be reinitiated if new information reveals impacts of the identified activity that may affect listed species or their critical habitat, a new species is listed, the identified activity is subsequently modified or critical habitat determined that may be affected by the proposed activity.

If you have any questions, please contact Colleen Coogan, of the Protected Resources Division, at 813/570-5312.

Sincerely,

Andrew J. Kemmerer
Regional Administrator

via Facsimile

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
9721 Executive Center Dr. N.
St. Petersburg, FL 33702

F/SER3:CCC:jbm

MAY 14 1998

Teresa McTigue, Ph.D.
Fisheries Biologist
Lafayette Office
Southeast Fisheries Center, NMFS
U.S.L., P.O. Box 42451
Lafayette, Louisiana 70504

Dear Dr. McTigue:

We have reviewed the Environmental Assessment (EA) forwarded to us on February 27, 1998 regarding the East Timbalier Island Restoration Projects (XTE-67, XTE-45/67b) in LaFourche Parish, Louisiana. These projects will use material dredged from Timbalier Bay to fill breaches and shallow ponds. An elevated dune and stabilization structures will be constructed to reduce erosional effects of waves and currents. Existing marshes will be protected and new marshes will be created. The National Marine Fisheries Service (NMFS) is the sponsoring agency and is one of five Federal agencies involved in the development of these projects to implement the Coastal Wetlands Planning, Protection, and Restoration Act of 1990. Your transmittal letter requested consideration of the effects of this project on listed species under NMFS jurisdiction, pursuant to Section 7 of the Endangered Species Act of 1973 (ESA). For the reasons discussed below, we believe that sea turtles and Gulf sturgeon, the only listed species under NMFS jurisdiction likely to be present in the project area, are not likely to be adversely affected by these projects.

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This concludes consultation responsibilities under Section 7 of the ESA. However, consultation should be reinitiated if new information reveals impacts of the identified activity that may affect listed species or their critical habitat, a new species is listed, the identified activity is subsequently modified or critical habitat determined that may be affected by the proposed activity.

If you have any questions, please contact Colleen Coogan, of the Protected Resources Division, at 813/570-5312.

Sincerely,

Andrew J. Kemmerer
Regional Administrator

United States Department of the Interior

FISH AND WILDLIFE SERVICE
825 Kaliste Saloom Road
Brandywine Bldg. II, Suite 102
Lafayette, Louisiana 70508

March 5, 1998

Teresa McTigue, Ph.D.
National Marine Fisheries Service
Southeast Fisheries Center
U.S.L., P.O. Box 42451
Lafayette, Louisiana 70504

Dear Dr. McTigue:

In response to your September 2, 1997, letter (received March 2, 1998), the U.S. Fish and Wildlife Service has reviewed the environmental assessment (EA) for the East Timbalier Island Restoration Projects (XTE-67, XTE-45/67b). Those projects are funded via the Coastal Wetlands Planning, Protection and Restoration Act of 1990. The following comments are submitted under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). and the Endangered Species Act of 1973, as amended.

General Comments

The EA is generally well written and comprehensive. However, that document should be revised to better address potential impacts and required interagency coordination involving threatened and endangered species, impacts to colonial nesting seabirds that may have colonized the project site since the last survey, and potential effects of deepening shallow bay bottoms in the borrow areas for the project. Furthermore, the readability and focus of the document would be improved if the general information on barrier islands and their value was greatly condensed.

Specific Comments

Page 2, paragraph 2 - There are extensive areas of Louisiana's coastal marshes which are not located behind barrier islands; this should be noted in the last sentence of this paragraph.

Page 8 paragraph 1.3 - This paragraph should be corrected to reflect the recent reduction in the State of Louisiana's required cost-share as a result of Federal approval of the Louisiana Coastal Wetlands Conservation Plan.

Page 10, figure - This figure should be labeled and a legend included (especially to define the hatched areas).

Pages 11 and 12, Section 2.2 - We suggest that this section be condensed, and focus more on the actual need for these two projects, rather than barrier island restoration in general.

Page 11, Section 2.2.2 - We question whether this project will reduce submergence of wetlands other than those receiving sand deposition.

Page 12, Section 2.2.5 - We seriously question whether loss of the barrier islands that fringe Timbalier Bay would result in the collapse of the fishing industry; we also question whether Timbalier Bay repesents "unique" fishery habitat.

Page 12, Section 2.2.6 - This section should be revised to reflect that, with the exception of the extreme southern portion of the active Mississippi River delta, the barrier islands provide the southernmost feeding and resting areas for bird migrating south from Louisiana across the Gulf of Mexico, and the first land area encountered in Louisiana upon their return. More-southerly stopover points are available in Texas and Florida.

Page 13, paragraph 1 - This section would be enhanced by reference to a clearly labeled figure showing the location of the various features of each project.

Page 13, paragraph 3 - The last sentence implies that the projected benefits may be reduced if costs increase. If this is the case, that fact should be more clearly stated.

Page 14, Section 3.1 - In reality, a shoal would likely remain if East Timbalier Island is completely eroded. Therefore, we believe that it would be more accurate to state that higher salinity waters would intrude more easily into the coastal marshes, rather than doing so "unimpeded", upon the loss of East Timbalier Island.

Page 16, Section 3.3.1 - We question the second sentence of the second paragraph of this section; we do not believe that increased water levels during storm events is a major cause of marsh loss on the barrier islands.

Page 19, Section 3.3.3 - This section may conflict with the information presented on page 16 (paragraph 1), which indicates that the Base Bid would not include bayside protection.

Page 21, Section 3.3.4 - We recommend that the rationale for aerial seeding with non-endemic species such as rye grass, rather than using native species, be included. The expected survival of non-endemic species in the harsh environment of barrier islands should also be addressed.

Page 32, paragraph 2 - The reference to the study by Peterson (1997) should be included in Appendix A.

Page 33, paragraph 1 - Reference comments regarding Paragraph 2.2.6 above.

Pages 34 and 35, section 4.2.3 - In the last paragraph of this section, the piping plover should be listed as threatened; that species winters in coastal areas of Louisiana, feeding on mud flats and beaches and roosting in sparsely vegetated areas. We suggest consulting with the Louisiana Department of Wildlife and Fisheries' Natural Heritage Program for details on piping plover occurrence in coastal Louisiana. Also, we wish to clarify that the interior population of least terns is endangered; the coastal populations are not endangered and need not be addressed in this section.

We also point out that consultation under Section 7 of the Endangered Species Act has not been completed with respect to those species for which we have lead responsibility. Please contact Terry Rabot of this office (318/262-6662, ext. 229) to discuss what actions will be needed to complete that consultation.

Page 37, Section 4.3.3 - According to a notice published in the Federal Register (Vol. 34, No. 73-Thursday, April 17, 1969) Executive Order No. 718, which established the East Timbalier Island Reservation "... as a preserve and breeding ground for native birds...", was revoked.

Page 40, Section 5.2.2 - The second paragraph should be revised to indicate how long the borrow areas will take to fill via natural sediment transport, and whether any stratification and subsequent dissolved oxygen deficiencies would be anticipated.

The fourth paragraph should indicate whether wading birds or sea bird colonies were observed in 1997 (e.g., during the Peterson study cited earlier in the EA). We also believe that caution should still be required to ensure that adult birds, eggs or young occurring in any newly established colonies are not harmed by construction activities; this generally means staying 1,500 feet away from those colonies during the nesting season.

Page 41, Section 5.2.3 - This section should be expanded to address beneficial and adverse, both direct and indirect, on other threatened or endangered species such as brown pelican and piping plover; such impacts might include creation, as well as temporary reduction, of roosting or feeding sites. This section should also clearly indicate whether any adverse impacts on Kemp's ridley are anticipated as a result of dredging activities.

The Service appreciates the opportunity to comment on the EA. If you have any questions regarding our comments, please contact me or Deborah Fuller of this office.

Sincerely,

David W. Frugé

David W. Frugé
Field Supervisor

cc: NMFS, Baton Rouge, LA

USDA United States Department of Agriculture

Natural Resources Conservation Service

3737 Government Street
Alexandria, Louisiana
71302

April 6, 1998

National Marine Fisheries Service
Southeast Fisheries Center
USL, P.O. Box 42451
Lafayette, LA 70504
Attention: Teresa McTigue

Dear Terry:

RE: EA concerning East Timbalier Island Restoration Projects (XTE-67 and XTE-45/67b)

The Natural Resources Conservation Service (NRCS) has the followings comments:

p3, 1.1.2, para1, sent2 - "Barrier island formation, ... extensively (Kwon, ~~1960~~ **1969?**; ... List et al., 1994 ; ; Lomardo, 1992 ; ; Reed, 1995)."

p4, 1.1.4, para1, sent6 - "Elevations of this levee varied between +2.4 and 5 ~~kil~~meters ..."

p5, 1.1.6, para1, sent3 - Washouts were deep, ... 1,220 ~~hectares~~ **meters** (4,000 feet)."

p5, 1.1.6, para2, sent1 - "In 1993, the total aland area ..."

p5, 1.1.6, para2, sent2 - "The back-levee is now neare the ..."

p5, 1.1.6, para2, sent4 - "In the area where ... (Williams, ~~1998~~ ***1997 or 1988?***)."

p6, para1, sent2 - "Average ~~waer~~ **water** depths ..."

p6, 1.2, para1, sent3 - *Close spaces between lines*

p8, Figure 2 - *Map is not very clear*

p9, 2.2.6, sent3 - "Upland vegetation is important for perch and resting habitat, **along with providing necessary habitat for prey species**."

p10, 2.2.7, sent1 - "Gulf of Mexico ... East Timbalier Island **(ETI)** are ..." ~~See~~ PAGE 1

p10, 2.3, para1, sent1 - "Subsequent to the inclusion of Central ETI ..." **[Need to explain prior to first stand-alone usage what ETI stands for, see above example on 2.2.7]** SEE PAGE 1

p10, 2.3, para2, sent3-4 - "The large difference is attributed ... the eastern end of the island." [*This is a fourth year project. Andrew was in '92, this volume should have been known going into project*] ?

p11, 3.0, para2 - *What does this have to do with alternatives?*

p12, 3.2, para1, sent4 "Sedimentary alternatives ... subject to erosion , (b) ..."

p12, 3.3, para2, sent3 - "Borrow areas shown ... but not in plans ~~Deseribe here?~~" *???*

p12, 3.3, para2, sent6 - "(4) Impacts to wading birds or sea bird colonies during the nesting season should be avoided." [*Page 31, 5.2.2, para4 contradicts this statement*]

p13, para1, sent1 - "1997-2204 (Reed ~~et al.~~, 1995) ..." [*It is 1998 - appears if not already shoal will have to be later than 1997*]

p13, para2, sent3 - "Proposals B and C are incrementally larger than Proposal A." [*The statement below contracts this*]

p13, 3.3.1, para1, sent4-5 - "The marsh platform width ... would be created. For Proposals ... in size." [*The width and hectares shown here are smaller in B and C than in A, thereby contradicting the statement above*]

p13, 3.3.2, para1, sent 1 - "Shoreline stabilization by the existing breakwater." [*Previous statements have questioned the stability of this offshore breakwater*]

p13, 3.3.2, para1, sent 3 - "The revetment would be built from 1.2 meters (-4.0 feet) ..."[*How will invert be set @ -4.0' will excavation occur or will it be placed offshore?*]

p13, 3.3.2, para1, sent 3 - "The revetment... of the dune along a 1:2 slope ..." [*Typical drawing appears to have rock slope of 2.5:1*]

p14, Figure 3, Typical Section, Proposal A - "Rubble Mound Revetment See Detail "A", this sheet" [*There is no detail A on this sheet*]

p14, Figure 3, Typical Section, Proposal B and C - "Rubble Mound Revetment See Detail "A", this sheet" [*There is no detail A on this sheet*]

p14, Figure 3, Typical Section, Proposal B and C - "+2.0' (finished elevation) Marsh Platform" [*Why grade to flat elevation?*] SEE SECTION 3.3.1

p15, Figure 4, Detail "A" Rubble Mound Revetment - (left drawing) [*What is thickness of rock layer?*] 2 LAYERS ~ 3.5

p15, Figure 4, Detail "A" Rubble Mound Revetment - (left drawing) [*What is borrow canal for?*] CONTAINMENT

p15, Figure 4, Detail "A" Rubble Mound Revetment - (right drawing) "Armor Stone Class 440 Riprap [*See page 4 and 5 of this report about rock that stayed in storm was 3-6 ton size. Why using 440# average wt rock?*] - NOT PROTECTED BY ROCKS NOW, SHORT TERM MEANS TO PROTECT ISLAND WHILE MAT. CONSOLIDATE IN TEXT 3.3.2

p15, Figure 4, Detail "A" Rubble Mound Revetment - "Notes: 1. Rubble mound revetment ..." [*Is this rubble or loose rock riprap?*]

p16, para1, sent3-4 - "Design height ... limits ~~af~~ **of** acceptable consequences and project investment. Armor stones would have an average weight of 440 pounds." [*See pages 4 and 5*]

p16, para1, sent5 - "A bed layer of crushed limestone ... underneath." [*Why use this?*] BUFFER ROCK/TBX - TO REDUCE SETTLEMENT.

p16, para2, sent1 - After careful ... chosen to be 1:2." [*Doesn't correspond to drawing*]

p17, 3.3.4, sent2 - "Planting smooth ... and Bermuda grass (*Cynodon* sp.) **along with Atlantic panic** by air ..." [*according to Cindy Steyer and Mike Materne plantings on dune top had very little survival with marshhay cordgrass, however did with Atlantic panic*]

p17, 3.3.4, sent4 - "Marshhay cordgrass ... planted on the **sides of the** dunes ..." [*see above*]

p17, 3.3.4, sent5 - "Smooth cordgrass ... would likely experience ~~some~~ **frequent** inundation ..."

p21, para1, sent2 - "The designated uses ... (Department of Environmental Quality, 1997)" [*LA or US?*]

p21, para2, sent5 - "Average discharges ... (Rabalais et al., 1995)"

p22, 4.2.1, para1, sent3 - " Invader species ... (Reed ~~et al.~~, 1995)."

p23, para3, sent3 - " A deep water ... hardhead catfish ..." [*scientific name?*]

p23, para3, sent3 - " A deep water ... brown shrimp (Penaeus azetecus), and squid (Lolliguncula brevis), and blue crab (Callinectes sapidus) ..." [*Italicize scientific names*]

p24, para2, sent1 - "The most recent ... (Peterson, 1997)." [*Cite on page 38*]

p24, para2, sent5 - "It was not used ... (Peterson, 1997)." [*Cite on page 38*]

p26, 4.3.2, para2, sent 5 - "~~Update to 1997~~" [*????*]

p28, para1, sent2 - "The lease is ... (Picciola & Associates, Inc., 1997)." [*Is this citation 1997a, 1997b or 1997c?*]

p28, para2, sent1 - "At least eleven ... (Picciola & Associates, Inc., 1997)." [*Is this citation 1997a, 1997b or 1997c?*]

p31, 5.2.2, para4, sent1 - "No colonies ... (Peterson, 1997)." [*Need to cite this reference*]

p31, 5.2.2, para4, sent2 - "Since the projects would be constructed during nesting season, ..." [*page12, 3.3, para2, sent6 states that nesting season construction will be avoided*]

p32, 5.2.3, sent3 - "The piping plover utilizes East Timbalier Island during the winter months." [*Common in migration but scarce in mid-winter*]

p32, 5.2.3, sent4 - "However, construction ... during the summer months." [*page12, 3.3, para2, sent6 states that nesting season construction will be avoided*] X OK W/ LSFWS 5/05

p36 - Department of Environmental Quality. [*Louisiana or U.S.*]

p36 - Edwards, E.W., Jr., **J.** McClanahan, ...

p37 - Kwon, H.J. 1969. [*or is it 1960? see pg3*]

p37 - List, J.H., and M.E. Hansen. **1994.**

p38 - Nakashima ... Geological Soc.~~, vol.~~ 38:323-329."

p38 - Penland, S. and J.R. Suter. 1988. Barrier ... ~~Transactions--Gulf Coast Association of geological Societies~~ **Trans. Gulf Coast Assoc. Geol. Soc.** 39:331-342.

p38 - Penland, S., K Debusschere, J.R. Suter ... 1989. The 1985 ... ~~Transactions--Gulf Coast Association of geological Societies~~ **Trans. Gulf Coast Assoc. Geol. Soc.** 39:455-470.

p38 - *add* **Peterson, ?. 1977. ????????** [*see pages 24 and 31*]

p39 - Reed... ~~Transactions--Gulf Coast Association of Geological Societies~~ **Trans. Gulf Coast Assoc. Geol. Soc.** 39:501-510.

p39 - Reed, D.J. ~~Ed.~~ **(ed.)**

p39 - Roberts, H.H. 1997. Dynamic Changes ... Research 13 ~~(3)~~ : 605-627.

p39 - Stone, G.W., S.J. Williams ... Research 13 ~~(3)~~ : 591-592.

p39 - Suhayda ... Research 13 ~~(3)~~ : 686-693.

p40 - U.S. Army Corps of Engineers. ~~1894.~~ **1984.**

p40 - U.S. Department of Agriculture. 1977. Gulf Coast Wetlands ... **76pp.**

p40 - van Heerden ... ... Research 13 ~~(3)~~ : 679-685.

p41 - Williams, S.J., G.W. Stone ... ... Research 13 ~~(3)~~ : 593-594.

Thank you for the opportunity to provide input into the .....

Sincerely,

Marty Floyd
Wildlife Biologist

cc: Britt Paul, WRPSL, Water Resources, NRCS, Alexandria, LA
Gary Eldridge, Civil Engineer, NRCS, Alexandria, LA
George Townsley, Economist, NRCS, Alexandria, LA

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
1335 East-West Highway
Silver Spring, MD 20910
THE DIRECTOR

AUG 20 ...

MEMORANDUM FOR: Susan B. Fruchter
Acting NEPA Coordinator

FROM: Rolland A. Schmitten

SUBJECT: Transmittal of the Environmental Assessment for the East Timbalier Island Restoration Project (Phase I and II), LaFourche Parish, Louisiana

The subject document is forwarded for your concurrence. It is the view of the National Marine Fisheries Service that no significant impact to the human environment will result from the proposed action.

Attachments

THE ASSISTANT ADMINISTRATOR
FOR FISHERIES

UNITED STATES DEPARTMENT OF COMMERCE
The Deputy Under Secretary for
Oceans and Atmosphere
Washington, D.C. 20230

AUG 25

TO ALL INTERESTED GOVERNMENT AGENCIES AND PUBLIC GROUPS:

Under the National Environmental Policy Act, an environmental assessment (EA) has been performed on the following action:

TITLE: The East Timbalier Island Restoration Project (Phase I and II), Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) Project XTE-67, 67B

LOCATION: LaFourche Parish, Louisiana

SUMMARY: The East Timbalier Island Restoration Project (Phase I and II), is funded under the CWPPRA of 1990. The U.S. Department of Commerce, represented by the National Marine Fisheries Service, is one of five Federal agencies (Task Force) responsible for coordinating projects to restore and prevent the loss of coastal wetlands in Louisiana. The other members of the Task Force are: the U.S. Army Corps of Engineers; the U.S.Environmental Protection Agency; the U.S. Department of Interior, represented by the U.S. Fish and Wildlife Service; the U.S. Department of Agriculture, represented by the Natural Resource Conservation Service; and the State of Louisiana. Thus far, a total of 80 projects have been authorized by the Task Force. As stipulated by CWPPRA, all projects are funded through a grant or cost-share agreement between the sponsoring Federal agency and the Louisiana Department of Natural Resources. A programmatic environmental impact statement addressing the Louisiana Coastal Wetlands Restoration Plan was prepared by the CWPPRA Task Force and a Record of Decision to proceed with the plan was signed March 18, 1994.

The major goal of CWPPRA is to restore and prevent the loss of coastal wetlands in Louisiana. The purpose of the East Timbalier Island Restoration Project is to restore wetlands habitat (marsh and dunes) on the island and increase the longevity of the island using soft structural (sand) techniques for habitat creation and hard structures (rubble mound revetment) where shoreline stabilization is needed.

RESPONSIBLE
OFFICIAL: Rolland A. Schmitten
Assistant Administrator for Fisheries
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, Maryland 20910
301/713-2239

The environmental review process led us to conclude that this action will not have a significant effect on the human environment. Therefore, an environmental impact statement will not be prepared. A copy of the finding of no significant impact including the supporting EA is enclosed for your information. Please submit any written comments to the responsible official named above within 30 calendar days, and to Bill Archambault, Office of Policy and Strategic Planning, Room 6117, U.S. Department of Commerce, Herbert Hoover Building, 14th and Constitution Avenue, N.W., Washington, D.C. 20230

Sincerely,

Susan Fruchter

Susan B. Fruchter
Acting NEPA Coordinator

Enclosure

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
1335 East-West Highway
Silver Spring, MD 20910
THE DIRECTOR

AUG 20 [illegible]

MEMORANDUM FOR: Susan B. Fruchter
Acting NEPA Coordinator

FROM: Rolland A. Schmitten

SUBJECT: Transmittal of the Environmental Assessment for the East Timbalier Island Restoration Project (Phase I and II), LaFourche Parish, Louisiana

Based on the subject environmental assessment, I have determined that no significant environmental impacts will result from the proposed action. I request your concurrence in this determination by signing below. Please return this memorandum for our files.

1. I concur. Susan Fruchter AUG 25 1998
Date

2. I do not concur. _____.
Date

Attachments